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Animal Disease in Southern Africa.*

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I trust that the members of this Society may be interested in the veterinary problems of a country the very name of which has long been associated with the occurrence of strange and destructive animal diseases, although most parts of it have proved to be perfectly healthy for man. South Africa in the past has tried very sorely, first the pioneer traveller and the hunter, and later the struggling farmer and the harassed veterinarian, with animal plagues in great variety; some have swept over wide tracts of country in waves, and others have worked quietly and insidiously, taking constant toll, and ultimately causing as much harm and loss as the more spectacular forms of epizootic disease.

South Africa to-day no longer deserves that reputation, but this fact should render the subject of greater interest to a veterinary audience.

Within the time at my disposal it would be impossible, even if it were desirable, to discuss so wide a subject in any detail, and I propose to attempt only a very general account of conditions in South Africa, the diseases with which the stock-owner has had to contend, and how the veterinary profession has faced its problems.

In a number of respects the natural conditions prevailing in South Africa have favoured the occurrence of disease. In a hot climate one may expect micro-organisms to be killed in large numbers by sunlight, but very little suffices to shelter them from the direct rays of the sun, and the relatively high temperature may permit multiplication in the field of organisms which in cooler climates are obligatory parasites.

The existence of wild animals in a country may be expected to favour the occurrence of disease in any domesticated species to which they may be closely related. Many of the parasites which have become adapted to existence in wild species will be able to infect the related domesticated forms, although the latter may probably be less resistant or tolerant, and therefore likely to suffer more severely; in some instances a parasite which causes little obvious harm in the wild animal is apt to induce in the domestic species a severe and fatal disease. In this respect South Africa, with its rich ungulate fauna, presents conditions very different from those encountered in some other countries in which the European has settled, and to which he has taken his animals. The many forms of antelopes in South Africa may be regarded, from this point of view, as constituting a potential menace to the domesticated ruminants, and the zebra (and formerly the quagga also) to the domesticated equines; moreover, the conditions which prevailed until comparatively recently, and perhaps especially the sparsity of the human population, favoured the existence of these animals in very large numbers.

The presence of large troops of these ungulates naturally encouraged the multiplication of blood-sucking invertebrates, such as ticks, mosquitoes and flies, which were liable to act as intermediate hosts for parasites, or as agents for their mechanical transmission from one mammal to another. These invertebrates also tended to attack the domestic animals most nearly related to their natural hosts.

It must be remembered that in South Africa the domestic herbivora live almost entirely in the open air, and, with the exception of horses which are actually at hard work, they depend almost entirely for food on what they can pick up at pasture. The pasture on which they graze is still chiefly, and until quite recently was practically always, natural mixed vegetation; these conditions must favour the occurrence of various forms of plant-poisoning, and they also encourage the continued existence of many parasites.

Under the conditions which have prevailed in South Africa, and which exist to some extent at the present time, the greatest risks have always been run by the newly-imported animal, which has had no chance of acquiring a tolerance for the local parasites, nor an ability to discriminate between good and bad in the local vegetation. The newly-introduced animal might also be expected to suffer some loss in general vigour and defensive power, under the influence of the unaccustomed heat, but it appears that this factor, although not altogether negligible, is usually not of any great importance.

It should be noted that natural conditions are far from being uniform throughout the country, and there are considerable climatic and other differences. In the low-lying parts there is a cooler season, but no really cold weather occurs, and various blood-sucking invertebrates may flourish throughout the year, although they are found in smaller numbers in the cool season. On the "high veld", however, there is a real winter; the days are usually bright and sunny, but they may be quite cold, and the nights are often very cold and even associated with hard frost. The occurrence of frost may have very great importance, on account of its effect on such invertebrates as mosquitoes, and consequently on the diseases transmitted by them. For example, in a bad horse-sickness season the first good frost is welcomed as marking the last day on which the disease is likely to be contracted; before concluding that no further cases will appear, however, one has to make allowance for the period of incubation of the disease.

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In different areas we also find considerable variations in the amount and distribution of the rain-fall, and this factor has important effects on the invertebrate transmitting agents of disease and on the vegetation available as food. Throughout the greater part of the country the wet season occurs in the spring and summer, and it is quite exceptional for rain to fall (in any significant amount) during the winter, but in certain areas the winter is the season of the greatest rain-fall. The occurrence of the rains in the summer or the winter has obviously an important bearing on the question of disease, having regard to the necessity of both warmth and moisture for the development of many parasites, and of such invertebrates as mosquitoes.

Secondary to variations in the soil and in climatic conditions, we find great differences in the vegetation; these differences influence the domestic herbivora in a direct manner, since they affect the plants which may be taken as food, and also indirectly, by favouring or discouraging the multiplication of certain invertebrates. For example, the presence of thick, rank vegetation favours considerably the persistence of some species of ticks, and the shelter afforded by trees and bushes is necessary for the existence of some species of tsetse flies, and especially for their breeding.

Of the diseases which are or have been encountered in South Africa, we may recognise some as being indigenous to the country or having existed in it for a long time. This group includes especially diseases which require an invertebrate agent for their transmission—some, including various forms of trypanosomiasis and piroplasmosis, are due to protozoa; others are caused by filtrable viruses, and as examples of these we have horse-sickness, bluetongue in sheep, and heartwater in cattle and sheep.

There are many other diseases which we know to have been introduced within comparatively recent times; many of them have been brought to the country with animals imported from Europe or from other areas overseas, but some have reached South Africa by direct spread overland. In connection with the introduction of new disease, we recognise especially the influence of man and the importance of his use of animal transport; some disease has also been introduced with animals brought in to improve or replace the native stock. Of particular importance, in connection with the introduction and spread of disease, have been various wars, and, in some instances, the measures adopted later to repair their ravages. For example, East Coast fever was introduced to the country towards the end of the Anglo-Boer War of 1899-1902, and its spread in Natal was greatly favoured by the Zulu rebellion of 1906.

Included in this group of more recently introduced diseases we find further conditions caused by protozoa and filtrable viruses, and needing an invertebrate host or carrier, and also rinderpest, and a host of the bacterial diseases which are common in Europe.

In fact, one may say that most of the important animal diseases which occur in Europe are seen also in South Africa, although some of them are by no means common, and doubtless many of them have existed in the country for a comparatively short time. There are some, however, which occur very widely, and which have most probably been present for very many years. This applies to anthrax, and the resistance to anthrax shown by the cattle in some areas strengthens the suspicion that the disease has long been enzootic in the country, or at least in some parts of it. Blackquarter also occurs very widely, and probably the same may be said of bovine contagious abortion. I have encountered contagious abortion in mares, and also in donkey mares, but it appears not to be at all common.

Tuberculosis is met with in dairy cattle in some of the towns, but there is very little on the farms. During fifteen years I saw only two cases in dogs, and, as far as I am aware, the disease has never been encountered in South African horses.

Johnë's disease is found occasionally in imported cattle, but I know of no recorded case in a South African-bred animal. Tetanus is rarely seen, but occasionally causes losses among lambs and kids after castration and docking. Purpura is exceedingly rare. During fifteen years' residence in the country I saw cases only on one occasion. On that occasion a considerable number of cases occurred in horses which were recovering from an attack of an extremely infectious disease, associated with fever and catarrh, which swept through the country with extraordinary rapidity. I believe that cases of purpura occurring at this time were the first which had been seen in South Africa by veterinarians who had been in the country much longer than I had.

Distemper is seen occasionally, but it appears not to be at all common, and a dog which is said to have distemper is usually suffering from biliary fever; there is some reason to think that true distemper is now becoming more common in certain of the towns. Swine fever has long been known to occur, although the losses from this cause do not seem to be serious, but, as far as I am aware, no outbreak of swine erysipelas has yet been encountered.

It may, perhaps, be of some interest to mention a few of the most important events which stand out in the veterinary history of South Africa, and which divide it into a number of distinct natural periods. Of the state of affairs in earlier times we learn something from the writings of the pioneer hunters and travellers, and also something from the traditions which have been handed down amongst the Boer farmers. The diseases which in those times were of the greatest importance, or at any rate those which impressed most the early travellers, appear to have been "tsetse-fly disease" and horse-sickness.

The first great event recorded in the veterinary history of the country occurred in 1870, when redwater was introduced, probably from Madagascar. There were very few veterinary surgeons in the country at that time, and the disease itself was not understood. It is not surprising, therefore, that it spread practically throughout the country and caused severe losses; it is now so well-established in most areas that it is

commonly regarded as one of the diseases natural to the country.

In 1896-7 the country was in the throes of a great outbreak of rinderpest, which spread southwards through the continent of Africa until it ultimately reached the Cape. Rinderpest caused losses of such severity that the whole population of the country was deeply impressed, and a large proportion was more or less directly affected. It became common for people to fix the dates of events by indicating whether they occurred before or after the rinderpest, just as some years later the Anglo-Boer War provided another landmark. The effects of the rinderpest outbreak were very serious, but, nevertheless, they brought some desirable results in their train. In the first place, research was stimulated, and a number of distinguished workers was induced to take up the problem, with the result that our knowledge of the disease, and especially of methods of controlling it, was much advanced.

Secondly, a considerable number of young veterinary surgeons was obtained from Europe ; the pre-existing veterinary services, hopelessly inadequate in size, were much augmented, and new services made their appearance.

At this time a curious but welcome phenomenon was recorded, for nagana disappeared from the Eastern Transvaal, and no cases have since been recorded from that area. The explanation which for years was almost generally accepted was that the rinderpest, in killing off a large proportion of the domestic cattle, and more especially of certain species of wild antelope, had robbed the tsetse flies of their natural source of food, and had thus caused the disappearance of the flies from that area. This explanation has since been disputed, and it has been pointed out that for years previous to the rinderpest outbreak the area infested by " fly " had shown a marked tendency to contract. The question is one of great practical importance for all territories in which tsetse flies occur, and in which a policy of wholesale game-destruction (so undesirable in most respects) may be recommended for the protection of the domestic animals.

A few years later the Anglo-Boer War, like all wars, brought many veterinary problems in its train, and such diseases as glanders and epizootic lymphangitis became prominent. Moreover, during the war itself, and during the period of reconstruction that followed it, animals brought from oversea territories were constantly falling victims to diseases to which the ordinary adult South African-bred animal has acquired an immunity (*e.g.* biliary fever of equines) ; there was, therefore, a great increase in the number of the cases of such diseases and in the severity of the cases seen. From the veterinary point of view, however, the most important event of this period was the introduction of East Coast fever, which gradually spread over a considerable part of the Transvaal, Natal and Rhodesia. East Coast fever caused the death of many cattle, and the measures which had at first to be enforced included the slaughtering of many healthy in-contacts, and the imposition of strict quarantine for such a prolonged period as fifteen months after the last case. Such measures were naturally irksome, and even ruinous, to the individual farmer, and costly to the Government, and they had to be applied over a considerable period. Some of them are in operation to-day, and the drastic remedies which were applied have been justified by the results attained : the disease is now confined, in the Transvaal, to a small number of very limited areas.

East Coast fever cost the country a great deal of expense and considerable trouble, but its effects were not wholly unfavourable ; one can assert that the introduction of the disease in some respects actually hastened the development of the country. For example, the compulsory enclosing of all farms by proper fences, and even the subdivision of farms, became necessary in areas where previously no attempt had been made to do more than survey the land and define boundaries. Of still greater importance were the effects on the veterinary organisations and on the legislation relating to animal disease. As rinderpest really brought the veterinary services into existence, so East Coast fever consolidated and strengthened them, for it became necessary to keep large areas of the country under very close and constant supervision. Moreover, research was stimulated, and the laboratory workers, with the advantage of improving facilities and (through the field staffs) closer touch with events on the farms, were learning much, not only of East Coast fever but of many other diseases.

The introduction of short-interval dipping altered very considerably the position with regard to East Coast fever, the disease against which it was especially directed, but it did very much more than that. All the other tick-borne diseases, such as heartwater and the piroplasmoses, were more or less equally affected, and even diseases of quite a different nature ; for example, it was observed that the common and widespread ophthalmia of calves tended to disappear where dipping was practised, and the general condition of the cattle was much improved.

It may be noted that the dipping of a large herd of cattle, which may have to be repeated every third or fifth day, is by no means as lengthy and arduous a task as one might be tempted to expect. The cattle very soon become accustomed to the process, and the whole operation can then be conducted with remarkable speed and order.

During the subsequent period, when trypanosomiasis had disappeared from all but a very small portion of the country, and the piroplasmoses and allied diseases had been brought under control, veterinarians and stock-breeders began to realise the toll that was being taken by other diseases, and more particularly the losses from anthrax, lamziekte and various forms of plant poisoning. Among the most important of the diseases affecting the domestic animals of South Africa at the present time, we find anthrax, contagious abortion, lamb dysentery, and various forms of helminth infestation ; the resemblance to the conditions prevailing in many European countries is apparent.

One marked feature of the recent veterinary history of the country has been the increased importance of different forms of plant poisoning, and especially of certain peculiar forms of chronic intoxication, with a more or less prolonged incubation or latent period. The development of the country has involved the restriction of grazing areas, owing to the enclosing and subdivision of farms, accompanied by considerable increases in the number of animals grazing on them, with a consequent limitation of choice in diet. It is clear that these plant intoxications are likely to attract considerable and increasing attention for some time, and particularly whenever drought or other abnormal conditions prevail.

Of the diseases encountered in South Africa, there are two classes to which some special reference may be made.

In the first place, there are many diseases that are peculiar to, or mainly found in, tropical and semi-tropical countries, and some which appear to be confined to the African continent. This group includes various forms of trypanosomiasis and piroplasmosis, and such diseases as horse sickness, heartwater and bluetongue. One of the most interesting diseases of the country (although apparently not confined to South Africa) is lamziekte, which affects cattle almost exclusively, although it has been stated to occur in donkeys, ostriches and geese. It appears in different clinical forms, but is characterised especially by a loss of power in the limb muscles, and there may be local paralysis, particularly of the tongue and pharynx.

Lamziekte has caused very severe losses over a considerable part of South Africa, especially on the western side, and cattle-breeding had to be abandoned almost entirely in some districts which otherwise were particularly adapted to it. The determination of the nature of the disease proved to be a most difficult problem, for the evidence was most conflicting, and the final elucidation of the truth constituted a real triumph.

The actual cause of the disease has now been shown to be a toxin elaborated in dead animal matter by a soil saprophyte of the botulinus type; this toxin is not destroyed in the alimentary canal after ingestion. In an area infested with this organism, the ingestion of any putrefying animal matter (*i.e.* any part of the carcass of any kind of animal, whatever the cause of death) is liable to cause an attack of lamziekte, but one has naturally to enquire further why any herbivorous animal should ingest such material at all. The explanation of the occurrence of the disease involves a further factor—the existence in cattle of a form of pica, or depraved appetite.

It has long been known that the soil, over a considerable part of the country, is poor in phosphorus, and, at least when certain climatic conditions prevail, the vegetation grown on such soil has also an unusually low phosphorus content. It has also been observed that the cattle in such districts, especially at certain seasons, are apt to develop an abnormal appetite, and to consume greedily objects which would be rejected at once by normal bovines. In the affected areas no harness or saddlery can be left within reach of the cattle, for all leather articles and reins (the raw-hide ropes which are in common use) are eagerly devoured.

Clothing hanging upon a line and such articles as the side-curtains of a motor car are quite attractive to such animals, and I have seen cattle busily chewing pieces of ironstone split off during building operations. Most striking, however, is the tendency to eat decaying animal matter, and where the craving is bad whole carcasses of dead animals, if allowed to lie, are gradually eaten by the cattle.

I know of one instance in which an ox, from eating the bodies of dead tortoises, finally learned the trick of catching and chewing live tortoises, which were very abundant on that particular farm.

The association of phosphorus-deficiency with pica in cattle was noted as long ago as 1884 by Hutcheon, who also believed lamziekte to be a direct consequence, but there were many discrepancies to be explained, and the actual administration of phosphates, as a preventative, seemed to give conflicting results. Moreover, phosphorus-deficiency and pica were found to occur, even in extreme degrees, in places in which lamziekte was unknown; the explanation, provided by the later work of Theiler and his co-workers, is that in such areas the toxicogenic bacillus is absent from the soil. We have here a remarkable association of different factors, affording a problem that was most difficult to unravel, but, thanks to Theiler, we now understand that, in the absence of the particular soil organism, phosphorus-deficiency prevents normal and rapid growth of young cattle, and in the adult leads to pica and poor condition, but never to lamziekte.

On the other hand, where the phosphorus supply is normal and pica absent, the presence of the bacillus and of its toxin cannot affect the cattle. It should be noted that the other domestic herbivora have been shown experimentally to be very susceptible to the action of the toxin, but they do not develop the pica, and so escape. It may be added that Theiler has instituted a regular system of testing, by the aid of which a farmer can pick out all cattle that are developing the craving to a dangerous degree; these "cravers" are then fed heavily on phosphate (in the form of sterilised bonemeal) until the appetite is again normal.

This system, associated with the discovery and proper disposal of all animal carcasses (not always an easy matter on farms of 5,000 acres or more), should cause losses in the future to be practically negligible.

The other diseases which I wish to mention briefly may be described as familiar diseases in unfamiliar surroundings or form. For example, in some areas anthrax occurs quite commonly in a form which is not at all familiar in Great Britain. In these areas bovine anthrax tends to run a subacute course, the duration of *visible* illness being often as long as a week or ten days; these cases are quite commonly associated with the development of large swellings, especially in the region of the breast and throat. In fact, one may say that this form of bovine anthrax resembles rather that commonly seen elsewhere in

equines, and there is the further important fact that in this form the microscopic examination of the peripheral blood is less reliable as a means of diagnosis. It is said that on some farms many of these clinical cases end in recovery.

Anthrax occurs not uncommonly in ostriches, in which the course is acute, and it is quite common in goats, sheep and donkeys.

Glanders, which was formerly far more common in South Africa, was then often seen in mules and donkeys, as these animals are used in very large numbers for ordinary transport work. I expect, however, that many of the members here to-night are familiar with the appearance of the disease in these animals, in which it tends to run a very acute course. The same remark applies to strangles in donkeys, and this disease may work havoc, and prove very difficult to control, when it gains a footing amongst a large collection of these animals. It may be noted that in South Africa strangles is often seen in quite old horses; the disease is still known popularly by the Dutch name of "nieuweziekte," or "new disease," but it is not of very recent introduction.

Animals in such a country as South Africa may harbour many parasites which cause little or no disturbance of general health. As some of them may be encountered when one is seeking the cause of some obscure disease, it is obviously of importance that they should be recognised, and their exact significance appreciated, and Sir Arnold Theiler has done much valuable work in this direction.

Over most of the Transvaal and Natal, for example, almost any bovine, unless quite recently introduced, harbours in its blood at least five parasites (*B. bigemina. A. marginale, G. mutans, T. theileri*, and *Sp. theileri*), although it may be in perfect health and condition, and, if country-bred, it may never have been noticeably ill.

Caseous lymphadenitis, caused by the Preisz-Nocard bacillus, is very common in sheep, and it is only in exceptional cases that there is obvious disturbance of general health; where the enlargement of the bronchial and mediastinal glands is extreme, there may be interference with respiration, with indirect interference with grazing, and emaciation.

There are many helminths and other large parasites which are extremely common, and which seem very often to cause little, if any, harm; one example is *Oes. columbianum* in the sheep. "Sclerostomes" are found very commonly in the large intestines of horses—in some districts in practically 100 per cent. of the horses—and in most cases, at least, there is no evidence that they give rise to any definite ill-effects. It is of some interest to note that a very large proportion of these animals shows mesenteric aneurism, but apparently they do not at any time suffer from what has been termed "verminous colic." In fact, in my experience, "colic" is distinctly uncommon in South African horses living under ordinary conditions. Bots are very common, and in some districts, during the appropriate season, practically 100 per cent. of the horses harbour them; many farmers attach great importance to their presence, however, and it is common for them to ascribe cases of horse-sickness to this cause.

Before attempting a brief discussion of the work of the veterinary profession in South Africa, it is necessary to point out a few of the conditions under which that work has to be performed. During recent years there has been a fairly rapid transition from ranching on a large scale to more intensive farming; farms have become much reduced in size, but they are still large. Some of the farms on which fruit is grown under irrigation are quite small, when judged by South African standards, and in some advanced and favourable districts one finds stock farms of several hundred acres, but elsewhere the average size is 4,000 or 5,000 acres, and in some districts it may be much more than that.

Veterinarians are comparatively few in number. In the larger towns there are opportunities for a very limited number of men to conduct lucrative practices, although there, as elsewhere, the displacement of the horse by the motor has affected practice very severely. In the rural areas, however, the long distances to be covered render private practice, as known in England, quite impracticable. There are a few veterinarians who are primarily farmers, and who do a certain amount of private practice as a useful side-line, but country districts in general have to rely on the services of the nearest Government veterinary officer, who is a whole-time official engaged especially in the discovery and suppression of certain scheduled diseases.

The Government veterinarian renders many services in the treatment of diseases other than those dealt with officially, but in general he has to pay attention to herds rather than to individual animals, unless animals of exceptional value are concerned.

The veterinary pioneers in South Africa had a most difficult task to face, and their position must have been exceedingly unsatisfactory and, at times, very embarrassing. They were brought suddenly face to face with many diseases of which veterinary science then knew nothing, and until they had acquired considerable local experience they must often have felt quite helpless. What must have increased the difficulties of their position was the fact that the Boer farmer had a certain practical knowledge of those diseases, acquired partly from his own observations and partly from those of his neighbours and forefathers. The pioneer Boers, having left behind them all the comforts and help of ordinary civilisation, were forced to rely in every way upon their own judgment and their own resources. All the practical knowledge which they gained was carefully hoarded and handed on to the next generation, and, as many of them were very shrewd and keenly observant (qualities much encouraged by the circumstances of their life, and still prominently displayed), they accumulated a considerable mass of useful experience, and learned to avoid many dangers. Their interpretations of facts were of necessity often faulty, but their observations were sound, and they were able to

devise measures which proved their value in actual practice.

Men who had grown up in this school had absolutely no faith in newcomers with specialised training of any kind, and they certainly had none at all in veterinary surgeons from Europe; the obvious fact that they knew far more about many of the local diseases than the newly-arrived veterinarian renders intelligible and excusable their belief that they could expect no real help from that quarter. Fortunately, there were men with the patience and ability to overcome all difficulties and prejudices; they carefully collected and recorded the great store of facts which the farmers had accumulated, added their own skilled observations, and interpreted them in the light of their specialised knowledge. There are many veterinarians who have rendered good service to South Africa, and who have given many years of devoted and able work, but two names stand out very prominently. The first is that of the late Duncan Hutcheon, M.R.C.V.S., who a did a truly enormous amount of pioneer work in Cape Colony. Hutcheon seems to have seen almost everything, and he must have been a man of very great powers of observation; most fortunately, he recorded his observations with the same untiring zeal, and when one wishes to study some obscure condition in South Africa, it is still advisable to begin by reading what Hutcheon had to say on the subject. The second name is that of Sir Arnold Theiler, and it is hardly necessary to attempt any account of his work, which is familiar enough to all who are interested in tropical disease.

I consider South Africa to have been very fortunate in having had the services of such a pioneer as Hutcheon, and of an investigator and experimentalist of Sir A. Theiler's ability.

With the time at my disposal it would be impossible to attempt any appreciation of the great administrative work carried out by the heads of the various veterinary services. A most efficient field staff was organised in the Transvaal, soon after the Anglo-Boer War, by Sir S. Stockman, but, as you are all aware, Sir Stewart left the country soon afterwards to take up a position of great responsibility in this country. The work in the Transvaal was then taken over by Mr. C. E. Gray, who had already shown his administrative ability in Rhodesia, and he was afterwards for many years head of the service for the whole Union of South Africa.

While it is impossible to discuss adequately the work that has been done, it is only right that one should refer to the valuable services which have been rendered by the district veterinary officers. Their work is not performed in the lime-light, but it is often arduous and exacting work, requiring the utmost patience and tact, and, however wise may be the general policy that is formulated at headquarters, much of its success or failure may depend on the manner of its interpretation in the districts.

As far as actual results are concerned, one may say that some diseases, such as rinderpest and contagious pleuro-pneumona, have disappeared entirely, and some, such as epizootic lymphangitis, have been practically (and perhaps now entirely) eradicated. Glanders is no longer a source of serious loss, and very many other diseases have been brought under control.

The value of the work of the veterinary profession in the country is shown best, however, by three facts of a somewhat different nature. In the first place, during recent years there have been many examples of urgent requests being addressed to the Government to station veterinary officers in districts which formerly positively resented their presence.

Secondly, the agricultural products of South Africa are admitted freely into such countries as the United States and Great Britain, and it has even been possible to introduce into Britain a considerable number of live cattle from South Africa, as happened fairly recently when a valuable consignment of pure-bred Frieslands was admitted.

Perhaps the most striking evidence, however, is the fact that, in a country which formerly was notoriously disease-ridden, farmers are now prepared to introduce breeding animals of great value. Some very high prices have been paid for bulls, stallions and rams, and the improvement in the quality of the stock of the country, even within the fifteen years that I have known it, has been most striking.

The latest development is the establishment of a veterinary college at Pretoria. This college is attached to the University of South Africa, and there is a five-years course, leading to the degree of B.V.Sc. While, from one point of view, we may regret what must virtually mean the closing to our own graduates of an avenue of useful and interesting employment, in a country to which most men become very attached, we recognise this step to be a natural development, and I am sure that we shall all welcome the determination of the South African authorities from the start to maintain a high standard.

Discussion.

The President: I should like, from the Chair, to thank Dr. Andrews for coming here this evening and giving us the benefit of his experience in South Africa, and to congratulate him upon the excellent paper he has given to us. I desire to open the discussion myself, because I have served in South Africa. I took part in the Boer War on the Western side, under General Plumer, and I have brought with me to-night my old diary of that War. It is a private diary and I do not think the material in it has ever been put into print, veterinary or otherwise.

I am very interested in the diseases which Dr. Andrews has recounted. I only propose to speak of the diseases of the horse, although I am sorry to see that Dr. Andrews has not mentioned bovine pleuro-pneumonia, which at one time existed very severely in South Africa, and which disease bothered Plumer's force in his transport very much.

The essayist mentions glanders, which I am sorry to say, during the Boer War gave us a very great deal of trouble, and really it was a disgrace to an army such as existed in South Africa at that time. We had a very imperfect veterinary service in those days;

the care of animals in the field amounted to very little. There was no proper means of collecting the sick animals, consequently, a disease like glanders was very rife. It was particularly virulent in mules, and those of us who have experience of glanders know its virulence in mules and donkeys.

In regard to strangles, I had to clear Plumer's force out of Bulawayo on account of that disease; directly we got away it died down. Some of the cases were very bad indeed, involving the parotid gland, etc. Epizootic lymphangitis I never saw in South Africa during the Boer War. Dr. Andrews mentioned that colic was very frequent. In Plumer's force, when we were in Bechuanaland, we had a great deal of it, arising from the fact that we had very bad food, as a consequence of which the animals ate the alkaline sand.

I have been very interested lately in the organisation of the veterinary service in the Tanganyika Territory, and it struck me in reading through their report that the organisation out there was very good indeed. I am certain, although I have not seen the Uganda report, that it will be very good. South Africa, together with East Africa, has progressed very much indeed in veterinary matters. It is very satisfactory to note how extremely well the cattle diseases, like rinderpest, have been tackled in these countries.

I was also interested to note in Tanganyika, particularly in Dar-Es-Salaam, the beneficial effects of dipping. They had no cattle at all in Dar-Es-Salaam at one time; now about four thousand go through a dip per week instead of about twenty as formerly, and they have even got a most excellent milk supply at that place.

The subject that Dr. Andrews has laid before us is a very, very wide one, and if anyone wishes to ask a question on any particular point or disease, I am sure Dr. Andrews will be delighted to answer.

Captain KIRK: I also would like first of all to accord Dr. Andrews my hearty thanks for giving us such an interesting and excellent paper, and I desire to congratulate him on being able to deliver an impromptu address of so varied a nature for nearly an hour.

I would like to ask Dr. Andrews a question concerning the only disease of which I can think that he omitted to mention—what is the percentage of tuberculosis in Africa and, if it is low, is that due to the lack of humidity, or is it due to the fact that the cattle are always in the open air? So far as sclerostomes in cattle are concerned, I had charge of a section of a hospital in the war in which every one of the horses had sclerostomes, but colic was rare. In Pretoria, where many horses were affected with sclerostomes, what was the percentage of deaths, or did the parasites not appear to affect them to any great extent as they did in England? Here horses rapidly became emaciated and died off.

The PRESIDENT: In my remarks, I omitted to mention about horse sickness. In Plumer's force, with which I was, that gave us the most trouble of anything. As you know, the seasons are reversed in South Africa, and you get horse sickness chiefly in the months of March and April.

I have here in my diary the percentage of horse sickness that we had in Plumer's Rhodesian Regiment. He had five squadrons. The Rhodesian Regiment numbered altogether 414 animals, 65 of which were left behind at a place called Tuli. Ninety per cent. of the animals suffered from horse sickness in that place. We lost 52 per cent. The total of horse sickness deaths in Plumer's force was as follows: A Squadron, 33 per cent.; B Squadron, 24 per cent.; C Squadron, 14 per cent.; D Squadron, 15 per cent.; E Squadron, 36 per cent.; and Staff, 44 per cent. Total for the Regiment, 22 per cent. Three squadrons went through the very worst district in Bechuanaland; C and D went further round to an oasis and suffered less. In six months there were very heavy losses. I was very interested in horse sickness in those days, and I tried quinine, both by injection and by the mouth, two or three times a week. The treatment proved eminently successful, but I could not get enough quinine—it cost four shillings an ounce; otherwise, I am certain that I should have reduced that enormous loss in animals. In Plumer's Regiment, after the relief of Mafeking, we were met by Lord Roberts, and we were told that we were the only mobile force in South Africa, although we had lost those animals.

Major FOSTER: I should like to thank the President and the members of this Society for my welcome here to-night as a member—I used to be a member of this Society many years ago.

I desire to congratulate the essayist on the comprehensive manner in which he has dealt with his subject and also on the manner of delivery. I should like to ask him if he will tell us something about contagious bovine pleuropneumonia, and what is his opinion as to the "lunger"—whether he sticks to the old idea that the "lunger" is a danger, or whether he inclines to the view, now commonly accepted, that the "lunger" is not of so much importance in the spread of the disease as he was originally supposed to be?

Personally, I think that the "lunger" is a great danger, because he is very difficult to spot, and I believe that, though he is a "lunger," he is still infectious.

I appreciate very much Dr. Andrews' remarks about the officers in South Africa, because in Uganda we are a young service and our difficulties are very great. Uganda is a land of great distances, and in the field the veterinary officer has to be in charge of a huge district—anything from 150 miles square and containing anything up to a quarter of a million horned stock.

The HON. SECRETARY: I also should like to thank Dr. Andrews and to compliment him upon his paper. I do not think I ever heard a paper delivered in this room in which a man seemed to have such a perfect grasp of his subject. (Applause.) I must apologise for the poor attendance, which is due to the fact that the usual date of our meeting has been altered. I cannot discuss the paper very much, but I should like to ask Dr. Andrews about the sclerostomes. Do these parasites cause any marked debility in the animals there, and is any particular treatment adopted for the individual affected? Debility seems to me to be the most serious trouble which arises from them, and in many cases they are very resistant to treatment.

Dr. BIRCH, rising in response to the President's invitation, said: I could think of several questions I should like to ask, but I feel that by the time Dr. Andrews answers those already put to him he will have his hands full. I was in the Philippines during the outbreak of rinderpest there, and

I can compare the conditions there with those he describes: I can certainly sense a similarity in the two situations. I merely wish to ask what part Dr. Andrews thinks the use of serum played in the reduction of the disease, or whether it played any part at all? We found that the individual rancher could readily control the disease in his herd by the use of the serum simultaneous method, but there are certain objections to the use of that method as a means of general control in America, and I am wondering just what part that played in the reduction of rinderpest in South Africa.

Mr. PERRYMAN: I am sure we are all very greatly indebted to Dr. Andrews for his lecture to-night—it was most lucid and most interesting. As a town practitioner in London, I am afraid I cannot talk much about South Africa. I was, however, very interested in the disease lamziekte, in which the animals showed such a depraved appetite, and I should like Dr. Andrews to tell us what treatment was adopted to try and rectify that. It struck me that, if it were due to a deficiency of phosphates in the soil, treatment was indicated from the agricultural point of view to obviate the trouble. Dr. Andrews spoke about anthrax taking on a sub-acute form more than in England. It has occurred to me that anthrax, in many cases, is not so fatal as it is said to be, and that if animals were allowed to be treated, a great many of them would recover. I had an experience, many years ago, before the days of compulsory killing, when we had 75 per cent. recoveries in cattle and pigs.

As regards glanders, we all know that mules and donkeys in England have it in a more acute form than does the horse. The same applies to strangles. Dr. Andrews mentioned that an old horse that was in contact with a colt developed strangles; within the last few weeks I have had a very old horse with an acute parotid abscess. He had come into contact with a young horse with strangles. If old horses contract strangles, they not infrequently take it in a very severe form.

Professor WOOLDRIDGE: I am afraid that I cannot make any very useful contribution to the discussion, but I cannot help expressing the admiration aroused in me in regard to the pioneers of the work in South Africa. The difficulties they seem to have surmounted were tremendous, and it speaks wonders for the stout hearts of men like Hutcheon and Theiler that they stuck it in the way they did, and that they are at last recompensed for the work they put into it. The diseases of South Africa are quite unknown to this country, for the most part, but there are several affections to note. Dr. Andrews referred to what we do get in this country and, like Captain Kirk, I was rather interested in his reference to colic in parasitic cases. I do not think that in this country the common parasites are a frequent cause of colic and, with regard to strongyles, undoubtedly, of those that do cause it occasionally, the *strongylus vulgare*, in its immature stage, forming an aneurism in the large mesenteric artery, is the commonest, but here we only seem to get it in young animals—foals or yearlings. I consider that in old animals the aneurisms found occurred while the animals were very young. My experience in this type of colic in foals and yearlings is that it is very frequently fatal.

I was interested to hear what the President had to say with regard to his not having met with epizootic lymphangitis in South Africa during the Boer War; particularly so, as it is an undoubted fact that the disease was introduced into this country by horses returning from South Africa.

It is manifestly impossible for Dr. Andrews to give us an account of all these most interesting affections, but one concerning which I should have liked to have heard more was the pulmonary lesions brought about by crotalaria poisoning, because that might have some bearing on some of the lung lesions with which we meet in this country. This particular weed does, I think, cause an interstitial pneumonia after an incubation period of several months. The application to horses in this country appears to me to be in connection with chronic pulmonary emphysema ("broken wind"). It is a well-known fact that, amongst horses in this country, there is some close association between feeding and the onset of "broken wind." When you get instances of a more direct association than that, as in the case of interstitial pneumonia, it seems that it might be well worth while investigating as to whether or not there is any association between the lung lesions and the food material.

The PRESIDENT: I know that epizootic lymphangitis was introduced into this country from South Africa. I had the misfortune to meet the ships that brought it, but I never encountered it in Plumer's force, either in Rhodesia or in the Transvaal.

THE REPLY.

Dr. ANDREWS: The President mentioned bovine pleuropneumonia as one disease with which I had not dealt at all. I am sorry I omitted to mention it, but I felt that I was taking up too much of your time. It was a pity to omit it, because it is a disease with which the Veterinary Service in South Africa has obtained a great measure of success, and for many years now the Union of South Africa has been entirely free from it. When I first went there, there was a little, but only a little. It had been very bad and, as Sir John Moore has said, the ox-transport had a great deal of it. In 1909, however, most of it had been cleared out and there were only a few small centres, and during the years which immediately followed these also were cleared off. I might here deal with the question, raised by Major Foster, as to whether I would attach much importance to old "lungers." My opinions on that question are not first-hand—I only saw, personally, one small outbreak of "lung sickness," but the disease was dealt with very successfully in South Africa, and I certainly discussed it with the people who were responsible for the measures taken. They were of the opinion that the old "lunger" was a most important question and, in fact, the whole question in the eradication of the disease. The farmer and the transport rider insisted on regarding the "lunger" as a "salted" animal, and they put up a bitter opposition against the slaughter of these animals. That was the chief difficulty of the thing—the overcoming of the opposition to stern measures being adopted in the Union.

Sir John Moore mentioned the question of colic. Colic in horses was not particularly common, but Sir John mentioned having seen a lot of sand colic during the campaign. I also, although I have not seen it under conditions of

peace, did meet with it during the war. I think that in a number of cases in which animals appeared to be going down from sand colic, they had picked up the sand "up country," and had been harbouring it for some time. Under active service conditions the animals are apt to feed more greedily when they get the chance. The epizootic lymphangitis that has been mentioned was also not very common in South Africa in my time. It was common during the Boer War and it had been almost eradicated from the country when the last war broke out, yet, when the war had been going some months, the disease appeared in some mysterious fashion. It did not spread very far, however, and within a year we got it down to its former dimensions: it is now practically extinct.

Sir John Moore mentioned the question of horse sickness and the treatment with quinine. I think I may say that outbreaks of horse sickness show a good deal of variation in virulence. It does appear that when you get very virulent outbreaks no drug treatment yet tried has very much effect, but we got a large number of cases which were not of that type: we had outbreaks which ran, generally, a more moderate course, and it appears that in a number of these cases suitable treatment can bring about recovery. A large number of the horses that die from horse sickness are killed by bad management, and the majority of horses which develop it are, in any case, not seen by a veterinary surgeon soon enough to enable him to do a lot of good. I myself used quinine to a considerable degree, and I was convinced that it was of some value. I was able to try, on quite a large scale, the old Boer trick of rubbing the horses over with paraffin. They seem to have adopted the idea of the flying insect, because a number of them, if going out in the evening, rubbed the animal all over with a rag dipped in paraffin. I was expecting horse sickness to appear in the district before it did, and all the horses under my charge were rubbed with paraffin—we could not make any nice emulsion, we just diluted paraffin with water and rubbed them over quickly. I may say that I had not one case in any horse that had been under my charge for more than ten days.

Captain Kirk brought up the subject of tuberculosis. I would not attempt to fix any figure as the percentage of the cattle in South Africa affected with tuberculosis, but I should think that in the country as a whole the figure is exceedingly low. One rarely meets with the disease in the country districts (if, indeed, it does exist there), but in the large towns and amongst the dairy cattle there is a lot. The dairy cattle around Cape Town seem to have a great deal of tuberculosis, and Cape cows have been taken over the country, with rather bad results in other towns. I take it that the climate is not primarily responsible for the low incidence, as is shown by the fact that in the towns the disease does spread and is often very advanced, although the dry climate is regarded as being particularly favourable to human patients. Captain Kirk also brought up the question (mentioned by a number of other speakers) of sclerostomiasis and verminous colic. I would not wish to put forward any strong view on the subject, because there is a number of species which inhabit the large intestine of the horse, and I believe that the classification of that group of parasites is troublesome even to helminthologists, and some species may produce effects which others do not.

Professor Wooldridge, referring to the same question, has given his opinion that it is a recent aneurism in the young animal which gives rise to verminous colic, but most of the animals with which I have been associated have been adult horses. The question of the deaths from this cause in South Africa is intimately connected with debility and poor condition. Amongst adult horses, there appears to be very little direct trouble, as far as one can judge. It appears that horses can harbour a great number of these parasites without suffering any great harm, but I would not answer for the young animals. I think it is perhaps possible that these parasites in the adult are apt to act like a number of others; where one gets healthy, vigorous animals harbouring them, the animals suffer no particular harm, but they do suffer when they get debilitated from some other cause—conditions of drought especially.

Dr. Birch questioned me in regard to the part played by anti-rinderpest serum. I have no first-hand experience. Rinderpest worked great havoc in South Africa and then disappeared. We had a condition in which all our cattle were highly susceptible, and the disease swept through them rapidly and then died out. In the later stages vigorous measures were taken, but the method used was chiefly active immunisation. We have had some recent experiences of the use of serum alone, and during the last war rinderpest, which had been smouldering in East Africa, began to spread, and it was appearing on the borders of Northern Rhodesia. The South African Government, therefore, conferred with the Government of Northern Rhodesia, and sent a Commissioner to the Rhodesian Border. Mr. C. E. Gray, the principal officer of the Union, went out to the Border and superintended the establishment of camps and the use of serum, and they inoculated the native cattle with serum alone, so as to form a wide belt of passively-immune animals. Gray and a small number of helpers did an enormous amount of work there. Their efforts met with the greatest success—the disease never passed this belt.

Mr. Perryman referred to the treatment of lamziekte and the treatment of the soil. The treatment that was first applied, because it was the more rapidly acting, was the treatment of the animal itself with phosphates, and that was very successful. Theiler worked out a system of testing the cattle once a week and picking out the affected ones, and feeding them with ordinary bone meal.

A certain importance had been attached to the question of phosphorus deficiency by Hutcheon, and he had recommended bone meal feeding in the Western part of South Africa, where they got this craving in the cattle. Some swore by it and others gave it up. The latter did the thing in bulk with other materials, and there was no guarantee that the affected animals got the bone meal. The question of the treatment of the soil with phosphorus-containing manures was taken up, and a certain amount of work has been done on it. I have not heard the result, but I have no doubt that the condition can be successfully combated by that means.

Mr. Perryman also referred to anthrax, and I agree with him that anthrax is not by any means the inevitably fatal disease it is sometimes thought to be.

The Application of Gland Therapy to Veterinary Practice.

By J. Stanley White, M.R.C.S., L.R.C.P. (Lond.), Ph.C.

(*Continued from page* 432.)

The Suprarenals.

The suprarenal glands, or adrenal bodies as they are sometimes called, possibly rank next to the thyroid in importance. The gland consists of two parts, the cortex and the medulla, which are quite distinct in origin. The former is developed from the Wolffian body, which also provides the insterstitial cells of the reproductive glands, while the medulla is an outgrowth of the sympathetic nervous system. Physiologists have not yet satisfied themselves as to the function of the cortex, although in some extraordinary way it seems to be concerned with growth and development. The medulla, on the other hand, contains that remarkable substance, adrenalin, concerning which I shall have more to say in a moment or two. According to Biedl, it is the cortical portion of the gland which is essential to life. In fact, this worker claims to have removed the cortex, leaving the medulla intact, with the result that the animal died. Certain it is that removal or destruction of the gland in animals results in death within a period varying from a few hours to several days. As a rule, young animals survive the operation longer than adults. The usual course following their removal by operative procedure is that, during the first day or two, the animal appears normal; on the second or third day the appetite fails, and this is quickly followed by apathy and muscular weakness. Then comes great prostration, a marked fall in temperature, laboured respiration, irregular and weak heart action, and death in the course of three to six days, preceded by a condition of general paralysis. The literature contains a large number of references to extirpation experiments in animals, but I am afraid that I have not time to go into the matter in any detail.

In the human subject, disease of the suprarenal glands results in that well-known condition, Addison's disease, described by him in the year 1851. As you probably know, it is usually caused by a tuberculous degeneration of the suprarenals, although it may be due to destruction of the glandular substance by malignant growths or other diseases. The extreme prostration, subnormal temperature, the curious pigmentation of the skin, are all attributable to loss of sympathetic action. According to one authority whom I have consulted, veterinarians have not succeeded in finding a recorded case of Addison's disease in animals. A similar condition of affairs, however, can be produced, as I have explained, by removal of the suprarenal glands in animals, resulting as it does in death by progressive weakness and toxæmia. Various lesions have been associated with the suprarenal bodies in lower animals and, according to one observer, tumours of the suprarenal bodies are not very rare in ruminants.

On the other hand, the tumours involving the suprarenal gland in humans are of extraordinary interest, because it is tolerably certain that there is an intimate connection between sex characters and the adrenal cortex. Thus, it is recorded that tumours or hypertrophies of the adrenal body are sometimes associated with precocious development of the reproductive organs, and I have such a photograph, which I am able to show you to-day. Incidentally, it has long been noticed that there is a resemblance between the cells of the adrenal cortex and the interstitial elements of the ovary and testis and those of the corpus luteum. It has been suggested that the adrenal body may act through the mediation of the pituitary; the matter, however, is largely speculative.

Apart from the pathology of the glands, there can be no doubt that the suprarenals are of great service in certain emergencies, and I am referring more to their physiological action. Experiments seem to show that during times of emotional stress the adrenal bodies pour into the blood sufficient internal secretion to be of some service, possibly in increasing the power of sustained muscular activity. It has been suggested that the varying activity of the suprarenal glands plays an important part in the adjustment of the vascular system to the changes constantly taking place in the body. I have just referred to the function of the suprarenal in certain emergencies, and we cannot fail to be impressed with the fact that the additional adrenalin sent into the blood stream in circumstances of violent emotion, such as rage, pain or fear, must increase the amount of glucose passing from the liver into the blood, thereby providing a further supply of sugar to the skeletal muscles. By raising the blood pressure it also improves the nutrition and efficiency of the heart and the blood supply to the brain. That this is associated with a stimulation of the sympathetic nervous system is obvious, when we remember that the pupil dilates to increase perception of light, the sweat glands are active, the hairs tend to stand erect, thus giving the animal a more formidable appearance. In fact, the reaction of the animal to these emotional states by movements of attack or defence is rendered more effective. Leonard Williams puts it very picturesquely when he says that "the animal is indeed fitted for flight, fight and fright." Incidentally, adrenal exhaustion, or hypoadrenia, as it is called, in human practice would appear to be a definite pathological condition, and may play a part in functional states characterised by myasthenia, vaso-motor instability, and low blood pressure.

This brings me to the subject of adrenalin, the one active hormone which we have succeeded in isolating from these ductless glands. Adrenalin, as you no doubt know, was first isolated in 1901 by Takamine, and for commercial purposes is obtained from the suprarenal glands of oxen. So extremely small is the yield of adrenalin that it is necessary to work with the glands of some 20,000 animals in order to obtain one pound of the active principle. I need not go into the method of extraction, but I should like to say a word

about the action of adrenalin and its application to veterinary practice.

The effect of adrenalin is to produce constriction of almost all the arterioles of the body. It is not, however, confined to blood vessels, but extends to other structures in the body which are normally supplied with nerve fibres from the sympathetic system and, when given hypodermically, quickly stimulates the junctions of the sympathetic nerves with the muscles which they supply. Perhaps no other member of the whole materia medica has been put to so many uses as adrenalin. Owing to its action upon the blood vessels, it has been used with considerable success as a hæmostatic and constringent. It has been employed in dealing with post-partum hæmorrhage, and has been sprayed into nasal cavities for arresting epistaxis. This latter condition in racehorses is said to be prevented by an injection of adrenalin in doses of from 85 to 120 minims before a race. When combined with cocaine it retards the diffusion of this dangerous alkaloid, and thus larger quantities can be used without the risks which would necessarily follow if the drug were not localised. It also has an advantage in that it enables the surgeon to operate in what is practically a bloodless field. There is no doubt that adrenalin, especially when given intravenously, is probably the most powerful heart stimulant that we have at our disposal. Its effect, however, is somewhat transient, and personally I prefer pituitrin for the purpose. This would apply particularly in smaller animals.

The intravenous injection of adrenalin is said to act directly upon the muscular fibres of the vessel wall and, by producing a vaso-constrictor effect, forces the blood out of the abdominal vessels into the general circulation, thus causing a rise in blood pressure. It is stated that many an animal, apparently dead, pulseless, and with only an occasional gasp for breath, has been restored by this treatment. It should always be remembered that adrenalin is contra-indicated in light chloroform anæsthesia.

I have already referred to the use of adrenalin in milk fever, the usual dose being from two to four drachms. Adrenalin has been used in hæmoglobinuria with some success, in various eye conditions, notably conjunctivitis, and in obstetrical work, notably in straining after parturition, and in cases of prolapse of the uterus. Other conditions where adrenalin has been used include laminitis, the solution being injected over the plantar region, generally 3 c.c. of the 1:1000 solution being sufficient.

The Pituitary.

The pituitary body, or hypophysis as it is sometimes called, is a small gland situated at the base of the brain in the sella turcica or pituitary fossa of the sphenoid bone. It is connected with the brain by a prolongation from the floor of the third ventricle, known as the infundibulum. For a long period the pituitary body was looked upon as a vestigeal relic and as of no importance in the animal economy; in fact, it was not until 1895 that the gland was shown to exert an active influence upon the general body mechanism. The anterior and posterior lobes are quite distinct in origin. The former arises from the ectoderm of the primitive buccal cavity, whereas the posterior lobe originates as an outgrowth from the under surface of the mid-brain, and is thus nervous in origin. The two lobes appear to be separated by a little band of cells known as the pars intermedia which, according to some observers, is quite distinct from either the anterior or the posterior lobe.

Experiment has shown that removal of the anterior lobe is followed by death in a few days, although if only a portion of the lobe is excised the animal will probably survive, but will exhibit the usual symptoms of anterior lobe insufficiency. Removal of the posterior lobe is not necessarily fatal. It is a matter of some interest that in mammals the pars anterior is very much larger than the pars posterior, and, furthermore, the relationship of the two parts, one with the other, varies in the different orders. As a matter of fact, a study of the comparative features of the pituitary body brings out facts of considerable importance, particularly in the elucidation of the physiological functions of this organ. Thus, in the lowest vertebrates there is a complete absence of the posterior lobe or pars nervosa. In bony fishes, on the other hand, the maximum surface of nervous tissue is exposed by a series of branching processes to the epithelial covering, and this phenomenon obtains to a considerable extent in reptiles. Then apparently this feature disappears except for the evidence of epithelial increase in the pars nervosa, such as is seen in the cat and that tribe. Another interesting feature in the cat, and incidentally also in the opossum, is a cavity within the pars nervosa which is continuous with the third ventricle. Cushing and other distinguished observers believe that this constitutes a factor of prime importance from a physiological point of view. In amphibians and ungulates, blood vessels are very numerous in connection with the pars posterior. This, too, may be a point of some moment in regard to the physiology of this part of the pituitary.

The activity of the pars intermedia differs in different mammals, and appears to be greatest in the cat and dog, as far as the actual production of an obvious secretion is concerned. In the monkey and in man the pars intermedia and pars nervosa appear to be of small significance.

The removal of the greater part of the pituitary body in young animals leads to retardation of growth, to failure of sexual development, and to obesity. Similar results follow accidental injury in children but, in contrast with the effects of thyroid deficiency, mental development does not appear to be seriously impaired. In the human subject we refer to the condition as infantilism. Modern opinion holds that the retardation of growth and the failure of sexual development are due to the partial removal of the anterior lobe. Disorders of the anterior lobe have been classified according to whether they are the result of hypoactivity or hyperactivity of the gland, and each

of these classes is divided into pre-adolescent and post-adolescent diseases, depending upon the relationship which they bear to puberty and to the occurrence of the epiphyseal fixation of adult life. Thus, a deficiency of the secretion occurring in the pre-adolescent period is said to manifest symptoms of the Lorain-Levi type; this is the type of case to which I have just referred as being characterised by a classical arrest of growth in the osseous system, with complete aplasia of the genital system, but without any endocrine disturbance referable to the posterior lobe. A case of this type is distinguished from a case of adipose genital dystrophy, known as Fröhlich's syndrome, by the absence of girdle obesity, which is chiefly due to deficiency on the part of the posterior lobe. Other symptoms of posterior lobe insufficiency are also absent, namely, polyuria and, particularly, increase in sugar tolerance. This condition of Fröhlich's syndrome which, as I said before, involves both the anterior and the posterior lobes, is essentially an example of hypopituitarism. Here is an example of something of the kind in a dog. This animal had a portion of its pituitary removed at the age of eight weeks, and this photograph was taken twelve months later.

There is no doubt that the anterior lobe promotes skeletal growth and stimulates sexual development. In other words, it is essentially a masculine gland, if I may put it in that way. The posterior lobe, on the other hand, acts as a stimulant to non-striated muscle fibre, participates in carbohydrate metabolism, and assists in sexual development. It is, in fact, essentially a feminine gland.

On the other side of the picture we find that hyperpituitarism, and I am referring particularly to the anterior lobe, results in gigantism and acromegaly, beginning respectively in the pre-adolescent and post-adolescent periods of life. This state of affairs is responsible for some very remarkable developmental disturbances, which, as I said just now, vary in degree with the age at which they occur. Thus, if there is a congenital hypertrophy, that is, if the anterior pituitary enlarges before the epiphyses have united, there is a general over-development of the body, and the condition is referred to as gigantism. Many of the giants common to the circus side-shows exemplify this phase of pituitary disease. Hypertrophy occurring in adult life, as I said just now, gives rise to acromegaly. This condition, as you will see from the photograph, is characterised by a general over-development of certain bony structures; thus, the nose, lip and lower jaws become very enlarged, the orbital ridges project, the skin of the face, nose and lip is thickened, and the under-lip protrudes. Generally there is some evidence of intracranial pressure. I can find no record of cases having been observed in lower animals, although cases of tumours of the pituitary gland have been recorded in veterinary literature, but these are said to be very rare. Apparently, a general disturbance of vision occurs in these cases, owing to the proximity of the gland to the optic chiasma.

The most important preparation of the pituitary gland, from the point of view of therapeutics is, of course, pituitrin, which is an extract of the posterior lobe and possibly the pars intermedia. Pituitrin has a striking effect upon the muscular fibres of the gravid uterus at or very near term, bringing about rhthymic contractions, and it is in obstetrical practice that pituitrin has become so extremely useful, especially in canine practice. Its main indication is in uterine inertia, that is, cases in which contractions of the uterus are very weak or entirely absent. It is, for instance, of very great service when the fœtus is partially presented through the os uteri, yet the patient may be so thoroughly exhausted as to be incapable of completing delivery. In large animals pituitrin is useful when the labour pains are entirely absent. One or two doses will often save a considerable effort, both on the part of the operator and the patient. It may also be used to advantage in preventing post-partum hæmorrhage and shock. Its effect in the latter condition makes the preparation extremely valuable in cases of collapse following severe injuries or major operations. Pituitrin has a definite stimulating effect on the arterial system, increasing the force of the heart beat and, at the same time, lowering the pulse rate. The rise in blood pressure which follows its administration is much more enduring than that produced by adrenalin.

Pituitrin also exercises a stimulating influence upon the muscular coats of the bladder, and thus relieves vesical atony and, at the same time, has a similar effect upon the muscular fibres of the intestinal tract and will often induce peristaltic contractions in atonic conditions, particularly following major operations when nothing else is effective. It has also been used in controlling intestinal, pulmonary, and other forms of hæmorrhage. Its effect, however, differs from that of adrenalin, in that it acts more upon the muscle cells than upon the arterioles.

The effect of pituitrin on the milk-producing function is said to be to cause the udder to empty more quickly, although the quantity of milk does not appear to be affected. This possibility of pituitrin as a galactagogue was first suggested by Schafer some years ago, but in view of the fact that it does not appreciably alter the output, it does not seem that it is likely to be of very much value from a practical point of view.

Pituitrin is standardised by two methods—a determination of the blood pressure, the apparatus used being similar to that which is employed in the standardisation of adrenalin, and by the oxytocic test, depending on the characteristic action of pituitrin on plain muscle fibre. The latter is the method recommended by the Medical Research Council, and the one which will probably be official if pitruitrin is, as it must be, introduced into the next British Pharmacopœia. Briefly, the method consists in comparing the effect of a sample of pitruitrin with a standard, using for the purpose a piece of isolated uterus from a freshly-killed guinea-pig. The contractions of the muscle are recorded on a kymograph.

A word as to the dose of pituitrin in veterinary obstetrics may be of interest. In a young Pekingese bitch 1 c.c. doses have been given, but comparing the dose in the human subject, my suggestion would be to make it 0·25 c.,c., as there has been a marked tendency in recent years to cut down the dose considerably. In larger animals—the ewe for instance—2 c.c. of pituitrin have been administered, and subsequent doses of 1 c.c. every fifteen to thirty minutes if necessary. Veterinary surgeons on the Continent have reported successful results with pituitrin in uterine inertia in cows and mares; the dose given was 10 c.c., and in some cases it was necessary to repeat this after fifteen to thirty minutes. In his recent book on *Diseases of the Cat*, Kirk refers to pituitrin, and states that it has a wonderful effect upon voluntary muscle, being used in this connection in dystocia. The dose for cats is from three to five minims of the stock solution, but he states that there is no reason why this dose should not be repeated daily for several days.

An exceptionally interesting case of dystocia in an elephant (*Veterinary Medicine*, September, 1923) was reported to be handled successfully with a single hypodermic injection of pituitrin. The animal belonged to a circus which arrived at that city with an elephant that had been in labour for several days without showing any evidence of approaching delivery. On examination it was found that a man's arm is pretty short for elephant obstetrics. As it was only possible to touch the fœtus with the finger tips, the kind of presentation could not be determined. A very bad odour emanated from the vagina and from the arm used in the examination, indicating a rather serious state of affairs.

The entire pituitrin supply of the town was commandeered and injected subcutaneously behind the shoulder, after experiencing some difficulty in penetrating the tough hide of the patient. The dose was approximately 1 ounce.

The doctor instructed the keeper to await his return two hours later, when he would decide upon further treatment.

Returning at the hour agreed, he found a dead four hundred pound fœtus had been delivered thirty minutes after pituitrin had been injected, and the mother apparently a well elephant. There were no subsequent complications.

The use of the anterior lobe in human practice suggests itself in cases of delayed development, particularly in those cases not exhibiting the posterior pituitary features. Certainly in combination with thyroid, the effect of anterior pituitary seems to be much enhanced; in fact, in human practice anterior pituitary and thyroid together seem to give much better results than either anterior pituitary or thyroid alone. Very large doses can be given, either orally or by hypodermic administration.

Referring to the question of anterior pituitary and its effect on development, you will be interested in some work that has been done by Spaul at the Birkbeck College, who has been working with axolotls, a species of salamander; if these animals do not turn into land animals within nine months, they remain fishes for the rest of their lives. Working with anterior pituitary, and keeping these animals in an iodine solution, Spaul has succeeded in converting them into land animals within as short a space of time as three or four weeks. The photographs which I have will demonstrate the effect which anterior pituitary has on the growth and development of tadpoles.

The Pineal Gland.

The pineal gland is one which we can dismiss quite quickly—certainly from the point of view of its application in medicine. It is interesting, however, from a developmental point of view; in fact, we might almost regard it as a developmental relic. The gland, as you will see, is situated right in the centre of the brain, and it is suggested that, many millions of years ago, it may have represented the unpaired eye which was situated in the centre of the forehead. This functionless, unpaired eye, of which the pineal gland is supposed to be the useless shadow, still shows some evidence of existence in the embryos of certain lizards, but in no form living at the present time, as far as one has been able to trace, does the pineal gland retain an ocular function of high order.

Recent evidence shows that the pineal may be concerned with somatic and sexual development, although the administration of the gland substance is largely empirical. It has been given in cases of retarded mentality in children, and in cases of premature mental failure in later life. Cases have been recorded where a child has developed a remarkable precocity, increase in stature, growth of hair, etc., and an extraordinary mental vigour. Some people believe that these precocious children are suffering from an abnormal secretion on the part of the pineal gland. In fact, histology shows that, in children, the gland exhibits glandular cells which more or less atrophy in adults. There are one or two photographs here which would seem to demonstrate that the pineal is definitely concerned with growth and development; the increase in the growth of the chickens and guinea-pigs respectively is certainly striking.

The Thymus Gland.

The thymus is equally a gland which is of little importance, especially from the point of view of treatment, probably because we know very little about it. In the human subject it is situated in the upper part of the chest and neck, and apparently reaches its maximum quite early in life. It seems to act like a brake on the development of sexual maturity, presumably in the interests of somatic development. It has been suggested that the gland acts in forming white blood corpuscles, which are more numerous in the early months of life when presumably the thymus is active. As far as I know, there is no definite evidence that it forms an internal secretion.

Some workers claim that the thymus gland is concerned with bone development and that, as the result of thymectomy in very young animals, the skin becomes soft and pasty, the bones, especially the

extremities, are retarded in their development, and ossification is delayed. These observations are not borne out by the photograph I am able to show you.

I need not stop to discuss the subject of a persistently enlarged thymus, usually associated with a general overgrowth of the fatty tissues, producing what is known as status lymphaticus. I believe that the condition does occur in lower animals just the same as it does in the human subject, and presumably such animals would be just as liable to sudden death in the event of their having a general anæsthetic.

Incidentally, in a recent issue of the *Veterinary Journal* there was a reference to an enlarged thymus gland occurring in a cat. This condition of affairs was discovered only *post-mortem*, although it is interesting to note that the cat had always had a cough and been distressed if frightened or had had much exertion. The cat died suddenly after a few hour's illness. There was an unusual amount of fat for a cat two years of age and some slight congestion of both lungs, but certainly not enough to account for death. The thymus gland was very enlarged, being about three inches long and one inch wide. Although the statement does not appear, it would seem almost certain that this was an example of so-called "status lymphaticus."

Some experiments by two workers in America some years ago led them to conclude that the thymus gland is not essential to life in the dog. The extirpation of the gland produced no detectable alteration in the heart, teeth, contour of the body, muscular development, strength, activity or intelligence of the experimental animals. While extirpation of the gland probably does not influence growth or development, the possibility that it may cause retardation in development and delayed closure of the epiphyses cannot be excluded absolutely.

Another interesting point is that extirpation of the thymus probably produces no alterations in the organs of internal secretion, although the opposite may have been the case immediately following thymectomy. This point, however, was not covered in the experiments.

The Ovaries and Testes.

Lastly, I want to say a word about the sex glands, particularly the testis and ovary, which undoubtedly produce an internal as well as an external secretion. I should like to emphasise the fact that, just as with the other ductless glands, so the reproductive glands act in conjunction with one another. In other words, both the internal secretions of the testis and ovary are regulated and help to regulate and maintain the hormone balance as the result of direct co-operation with the suprarenals, pituitary, pineal, thyroid, thymus, mammary, etc. I have no time at my disposal to discuss the extraordinarily interesting histological structure of these organs, nor to go into any details regarding the manner in which they function. It is, however, a well-known fact that both the testis and ovary are great determining factors in the formation of sex, and that these effects are produced to some extent by hormone influence. As Aston has pointed out, we have only to consider the results of castration experiments on cattle, rats, rabbits and dogs, which have shown that the removal of the testis definitely affects the genital organs, depending upon the age at which the operation is performed.

The skeletal development is markedly affected, and different parts react in different ways. For instance, in the case of the ox, the bones of the extremities are certainly longer; the appearance of the skull in the castrated ox is well known to all veterinary surgeons. The pelvis in the developed ram and ewe exhibits marked differences, while the pelvis of the castrated of both sexes of all ages is almost identical. Animals with definite characters, supposedly characteristic of the other sex, tend to assume an asexual form; changes also occur in the pituitary, thyroid, thymus, etc., and these in particular account for the increased adiposity. It is quite an interesting fact that rats which have been treated in this way do not fight as a normal male does. According to French veterinarians, of horses which have been castrated, not more than 2 per cent. continue to show sexual activity.

It seems quite clear, as the result of experiments in transplantation and the injection of gland extracts, that the sex glands act by producing an internal secretion. Thus, if to a castrated animal a testicle is grafted, the sex characters which had deteriorated or changed, return. The results have shown that, to some extent, the sex characters can be influenced by an injection of gland material, thus proving that the influence must be exerted by these chemical energisers, as they have been termed.

In a paper read before the Derbyshire Division at Derby last year, Aston recalled the fact that the internal secretion of the testicle is secreted by the interstitial cells, and that is a point which I think is definitely accepted to-day. He went on to explain that in the rig horse, which shows all the characteristics of the stallion, even when the normal testicle presented has been removed, there will be found in the retained abdominal gonad only interstitial cells, with or without generative cells, in a state of degeneration. The result is that small particles of the male gonad seem to be sufficient to produce sex characters. It is, in fact, a demonstration of the law "all or nothing" as regards testicular hormone secretion.

Experiments have also been carried out on the ovary, from which it would appear that the ovarian function is controlled by quantitative laws, which reach their climax when the corpus luteum of pregnancy is formed, to recede with its degeneration, and to reach another climax with the start of the next pregnancy. There would appear to be no doubt that female characteristics vary over a wider range than in the male. This is probably due to the follicular development of the ovary and consequent varying hormone production.

The subject of sterility is a very large one and, of course, involves a lengthy search into the function of the corpus luteum, and I am afraid that I have no time to go into the question to-day. Suffice it to say that the function of the corpus luteum appears to be

to prevent the return of the uterus to an infantile state or atrophy, and to render possible the transformations of the mucosa necessary for the fixation and growth of the fertilised ovum.

Some two years ago, at the veterinary meetings at Aberdeen, Barker of Hereford read a very interesting paper on the subject of sterility in cattle, and I was very much impressed at the time that no reference was made to the possibility of dealing with the question endocrinologically. Obviously it is a big problem, and in the doses necessary would appear, at the present time at any rate, to be almost impossible. During the last few months an active hormone has been prepared from the liquor folliculi of pig ovaries The original work was done by Allen and Doisy, and in this country Dickins and Dodds have repeated the work. I am informed that this active hormone, which is extremely concentrated, will produce œstrus or premature puberty if injected subcutaneously into the rat. In a published statement of their work, Dickins and Dodds make the following remarks: "Here we have a body, 'the hormone,' the injection of a few mgms. of which causes, within forty-eight hours, a solid column of cells, the pre-pubertal vagina of the rat, to become a tube, in addition to the other cellular changes occurring in œstrus." This is certainly a matter of supreme interest, and it may be that in due course more intimate knowledge of the internal secretions of the reproductive organs will enable us to consider the endocrinological aspect of the problem, as well as to view the matter from the point of view of infection, which up to the present would appear to have been the only practical method available to us.

Recently, in human practice the use of corpora lutea in cases of sterility has been extraordinarily successful, especially in those cases where there has been scanty menstruation. In fact, one distinguished gynæcologist claims to have had 75 per cent. of successes in cases of sterility treated by this method.

In a short note in the *Veterinary Journal*, a year or two ago, Tutt reported that corpus luteum had failed to establish œstrus in a Pomeranian bitch, but that a successful result followed the administration of orchic substance. In this particular instance four 5 grain tablets had been given once daily. In a further note published seven months later the same author reported that this animal, which had been given the desiccated orchid substance, had had four very fine puppies.

I am informed that orchic substance, particularly if it is combined with anterior pituitary and suprarenal, is extremely effective in the case of stud hounds. On several occasions a combination of this kind has proved very successful, although it appears to be necessary to continue the administration of such a combination for at least three weeks.

In this connection it is interesting to note that the administration of orchic substance is said not only to provide a supply of testicular hormone in cases of deficient secretion, but also to stimulate the organ. Furthermore, it tends to bring about normal function at the same time that it exerts a tonic influence on the whole glandular system, and particularly upon those organs which are concerned in the production of energy; in other words, it enhances the hormone content of the blood. Gavin, some years ago, stated that no effects were observed to follow the injection of corpus luteum extract in milch cows; this, of course, from the point of view of milk secretion.

There are other glands, notably the *mammary* and *placenta*. In human practice one has seen remarkable results from the use of mammary, and especially in combination with placenta, when it is desired to antagonise the ovary in both its ovulating and menstruating activities. Thus, if we consider the chronological development of the true corpus luteum, the placenta, and finally the mammary, we find that the female is provided with a series of ovarian antagonists at the very time when it is undesirable to have ovarian activity, that time being the period of gestation and the period of lactation. Thus, the administration of mammary substance has been helpful in cases of subinvolution of the uterus, and particularly are cases of ovarian hyperactivity relieved in a remarkable way by the administration of desiccated mammary gland.

The placenta, on the other hand, occupies a unique position as an endocrine gland because it is present only during pregnancy. It begins to develop immediately after conception, and continues to secrete its hormone until it is separated from the uterine wall during labour. Its function has not been definitely determined, but the most likely explanation of its action is that it antagonises ovarian and posterior pituitary activity and that it augments hyperplastic development of the mammary glands. Whether or not it actually promotes the secretion of milk is doubtful.

I have, still left, the subject of insulin which is, after all, an internal secretion of the pancreas, a gland producing both an internal and an external secretion. Diabetes in veterinary practice is well recognised and I need not discuss the subject on this occasion, except to remind you that insulin in human practice is by no means necessary in all cases of diabetes. In fact, it is not in every instance that the pancreas is involved—it may be the liver; it may be the pituitary and, therefore, careful search is necessary before it can be assumed that a case of diabetes mellitus is necessarily pancreatic in origin.

Lastly, I ought to refer to the possibility of polyglandular therapy, and from what I have said you will gather that this aspect of treatment has arisen from a consideration of the relationship existing between various internal secretions. I have pointed out that this relationship is an extremely delicate one, and while in some instances a combination of glands may succeed in restoring the hormone balance, yet such a combination should be used only with caution. In every case it is better to try to determine which gland or glands are actually involved.

From this brief survey of the rationale of hormone therapy, I hope that I have been able to demonstrate that its uses are many and its application logical.

There should be an enormous field in veterinary practice, particularly with smaller animals. Increased knowledge of the functions of the ductless glands and their relations to each other must of necessity open up fresh fields of scientific prescribing, to the advantage, no doubt, of the reputation of medicine as an exact science.

REVIEW.

(**Veterinary Toxicology.** G. D. LANDER, D.Sc. Second Edition. *Ballière, Tindall and Cox.*)

The second edition of this standard text book has now been published. Dr. Lander's book has been for the last thirteen years one of the most valued of reference works, and the new edition contains a large amount of fresh material, together with further records of clinical observation. The general arrangement of the text has been preserved as in the original edition.

Particularly valuable is the account now contained of lead poisoning, and several abstracts of the acute type are quoted. Previously, very little information was available of the occurrence of the acute form among the larger animals, and the ease with which such symptoms may be confounded with other conditions is pointed out.

In the section devoted to Organic Poisons reference is made at some length to prussic acid poisoning arising from linseed cake—a condition on which further research appears to be necessary, and we hope that at some future date Dr. Lander will be able to add to our knowledge of the facts.

The section referring to Poisonous Plants is particularly good, and we note that appreciation is expressed of the excellent paper by Craig and Kehoe presented at the last Congress of the N.V.M.A.

The large amount of work entailed in the preparation of this edition is shown by the augmented list of authorities quoted, and Dr. Lander is to be congratulated on having added much profitable reading to what is already an indispensable work on Veterinary Toxicology. H. W. D.

The effect on the Irish cattle trade in the British markets of the importation of large numbers of Canadian cattle is dealt with in a report received by the Home Office from the Imperial Secretary's Department, Northern Ireland. It says that the menace of increased Canadian cattle imports is very real and quite outside the range of domestic conditions. Canadian cattlemen are making a very bold and determined bid to wrest from the Irish exporter the monopoly of the English store cattle market which he has so long enjoyed. In the British markets Irish stores of the better class have deservedly gained for themselves a very high reputation. So long as the Canadian product is the finished beast ready for the butcher there will always be a market for Irish stores of the right type. But it is quite within the bounds of possibility that a study of feeding and fattening conditions in Great Britain may lead to the production of an eminently suitable type of Canadian store beast to be placed in direct competition with the Irish product.

The Veterinary Record.

29th May, 1926.

THE R.C.V.S. ANNUAL GENERAL MEETING.

The Annual Meeting of the Royal College of Veterinary Surgeons will take place on Thursday next, the 3rd June, at 12 noon, and we trust there will be a large and representative gathering of members at 10 Red Lion Square on that occasion. As a general rule, these meetings are but scantily attended. Maybe this is due to the fact that the profession is satisfied with the work of the Council and content that it should continue without criticism. We prefer to put that forward as a reason, rather than to charge the whole profession with apathetic indifference to the manner in which their affairs are governed. But this is an occasion on which the elected representatives of the profession render, as it were, an account of their stewardship, and it is, therefore, an opportunity for the profession they represent to give some indication, either of approval or disapproval, of their labours. An Annual Report has been circulated by post, and will be open for general discussion at the meeting. It is but a very brief and condensed account of the year's work, yet it is full of interest for those members who still retain the sense of responsible membership. The President and Members of Council, who are for the time being the executive offiers of the profession, would naturally feel encouraged and helped if at Thursday's meeting there were such an attendance as indicated a general and sympathetic interest in the account of the year's work, and especially if there were forthcoming some intelligent and useful criticism or appreciation of it in debate.

It is intended at this meeting to distribute the Honours and Certificates which have been awarded by the Council during the year, first among which is the JOHN HENRY STEEL MEMORIAL MEDAL, which the President, on behalf of the Council, will present to Professor GAIGER. All will agree that we should give our honours in public, not in secret, as so often in the past, and this innovation is an additional reason why members should endeavour to be present at the meeting.

Not least in interest will be the declaration of the poll as the result of the election now taking place—and elections usually draw crowds together! May we hope that Thursday's meeting will prove to be to all the participants—President and members of

Council, recipients of honours, and audience—an occasion worthy to be remembered in after days.

* * * *

Mention should be made also of the Annual Meeting of the Victoria Veterinary Benevolent Fund which will immediately follow. Here, too, there will be the Annual Report to receive, and officers and Council to elect. The Fund is growing rapidly in importance, and a glance at the balance sheet and at the long list of recipients of its benevolence will suffice to prove that it is an institution of which many a larger profession could be proud.

Any member who can, therefore, spare the time to be present at these two meetings will find himself well repaid for his trouble.

GLANDULAR THERAPY.

The study of the functions of the various so-called "ductless glands" and their "internal secretions"—the science of endocrinology, as it has become generally termed—has yielded results of such great value to the veterinary and medical practitioner, and the future is so full of promise, that a review of this field from time to time is appropriate. The very brilliance of sound achievement has, perhaps naturally, encouraged much theorising. Both aspects of the matter are covered in a comprehensive paper by Dr. J. Stanley White in this and our last issue.

In any critical review of endocrinology the holding of an even balance is a matter of some delicacy and difficulty. It has been said that the first practical experimenter in this field was the Stone Age man who discovered—as he believed—that the eating of the heart of a fierce enemy slain by stealth or in combat, added to his own strength and bravery. This type of reasoning is recalled by some of the highly speculative matter published by various writers in recent years. At the other end of the historic line stands the practitioner, provided by modern research with such efficient therapeutic measures as the giving of thyroid in cretinism and myxœdema, and the injection of insulin in diabetes mellitus. These are true cases of "substitution therapy," the glands of animals supplying the missing factor to patients whose glands are defective. The interesting work on the ovarian extract recently published, and referred to by Dr. White, suggests that in the near future ovarian extract will have gained admission to this select band. Parathyroid extract presses hard also to win a similar place. Two other gland products of proved and great value we have in pituitary extracts and adrenalin, though their use cannot in the same sense be described as "substitution therapy."

When our attention turns to other gland products, our way becomes less certain, and there is need of much careful experiment and accurate clinical record before we shall reach the point at which our therapeutic knowledge is firmly based, and it is here that the keen research worker, bound by the cause he serves to scrutinise with some scepticism that which he cannot demonstrate in the laboratory, and the earnest practitioner, bound in his patient's interest to try anything which he reasonably believes may do good, find their chief cause of difference. Those who wish to follow these two points of view will find them clearly set forth by members of our sister profession in a debate* on this subject at Bath last year. In passing, we may note that the main contributions to this science have in the past come from human medicine, but recent veterinary literature shows that there is a welcome awakening to the greater opportunities of the veterinary practitioner, for he can almost always eventually secure an autopsy on his patients suspected to be suffering from difficulties of glandular secretion, and he has opportunities for experiment which are not open to the medical practitioner. But the veterinary surgeon will, in his own observations and his efforts to cure, rigidly separate facts from the hypotheses he forms, and remember to retain a detached spirit of scientific criticism in making his deductions, while not neglecting his duty to his patients to try not only that which will cure, but which he legitimately thinks may cure.

CLINICAL AND CASE REPORTS.

Undiagnosed Disease in a Cat.

By HAMILTON KIRK, M.R.C.V.S., Wigmore St., W.

A tabby male cat about five years old was admitted on *April 5th* for sickness, loss of appetite and slight paresis. A powder was given containing hyd. *cum* creta. *April 6*th, no result from the powder; nausea noticed; ½ oz. liquid paraffin given. *April 7th*, no action of the bowels and no sickness. Enema given with little result. Cat taking milk and a little fish. *April 8th*, cat uneasy but morose. Small hard pellet of fæcal matter passed. More paraffin and another enema given, but with poor results. *April 9th*, slight diarrhœic action to-day and the animal brighter. Feeding a little. *April 12th*, cat apparently normal and discharged from hospital.

The trouble seemed to have been obstinate constipation. On the *13th*, however, there was a message from the owner to the effect that the cat was going mad and crying out. Upon visiting, I found the animal unable to stand on its hind legs, its eyes oscillating and evidence of a good deal of pain, although nothing could be detected in the abdomen and no area of tenderness found. The temperature was normal and pulse very faint; respiration increased in rapidity. Removed cat to hospital and 1dr. syr. chloral, in three drs. gum mucilage, was given *per rectum*. Sleepiness and relief were soon induced. A few hours later a soapy enema was given, resulting in the passage of a quantity of clay-coloured gritty matter, resembling crushed and half-digested bone. A foreign body in the bowel was suspected, but was not detected upon palpation.

* *Brit. Med. Jour.*, Dec. 5th, 1925, p. 1051.

April 14th.—Extraordinary gyrations were witnessed this morning; the cat held its head parallel to the ground, as though suffering from earache. Examined both ears with electric speculum but found no lesion, or even acari. The body was convulsed with spasms and twisted and contorted in all directions. Many times the cat stood on its head, with the hind legs in the air. It clutched at the walls and its bedding, doubled its head under its sternum and manifested every sign of cerebral disturbance. Chloral was given again and measures adopted to get the bowels to act. *April 15th.*—The cat's condition was so distressing that I advised destruction. Having obtained permission, I chloroformed the cat and performed an exploratory laparotomy, in case some condition could be ascertained with which I could deal. As the viscera all appeared quite normal, chloroform was then rapidly administered until the animal expired. *Post-mortem* examination revealed absolutely nothing upon which I could base a diagnosis. The skull was sawn in two and a healthy brain exposed. The nature of the ailment remained a mystery, and if any member can throw any light upon it I shall be grateful.

A Breech Presentation in the Cow.

By W. L. Weipers, M.R.C.V.S., Glasgow.

Subject.—A middle-aged Ayrshire.

History.—Labour had commenced about 9 p.m. on the previous evening,and the owner, after unavailing efforts to remove the calf by employing traction to the tail (!) applied for help. I arrived about 3 a.m.

Examination.—During examination and delivery the cow maintained the recumbent position, in spite of all attempts to induce her to rise. The tail and buttocks of the calf were found less than a foot from the entrance to the passage. The position of the legs could not be determined, because one could not pass the arm beyond the buttocks, though there appeared to be a margin of clearance between the fœtus and the mother. Repulsion of the calf was now attempted, but every effort was countered by violent expulsive efforts on the part of the dam.

Having regard to all the circumstances, I considered that an attempt at delivery as presented was worth a trial, because, even should failure follow the attempt, little harm would accrue, provided every care was taken in its operation.

Delivery.—In the hope of minimising friction and assisting delivery by lubrication of the parts, ordinary soap was rubbed in to all the prominent places, and pushed as far forward as possible with the fingers.

A hook was now pushed into the calf's rectum and applied to the brim of the pelvis; two men applied traction to this, but only to assist the maternal efforts.

For some time little or no progress was recorded, but in about fifteen minutes the buttocks slowly appeared; little further resistance was encountered, and in a short time delivery was complete. The hind legs were found, on delivery, to be stretched well forward, the feet being between the fore legs.

The calf (a bull) was above the average size; the cow seemed none the worse for her experience, in spite of the unorthodox procedure employed in delivery, as she regained her feet and passed the after-birth in about two hours; later in the day she developed milk fever, from which she made an uneventful recovery.

The hook used was Blanchard's parturition hook (Arnold), a very useful instrument.

ABSTRACTS.

(Arteriosclerosis in Domestic Animals. S. A. Goldberg. *Jour. Amer. Vet. Med. Assoc.*, vol. 22, No. 1.)

In this article eight cases of arteriosclerosis in animals are described—four cases in cows, three in horses and one in a spaniel dog. Two of the cows were aged, one was four-and-a-half years, while the age of the fourth is not stated. On *post-mortem*, all these animals showed arterial calcification in the form of plaques involving the abdominal aorta and extending in some cases to the iliac arteries. The mesenteric and pulmonary arteries were also affected. Microscopically the intima was thickened by proliferated fibrous tissue, while the media showed calcification beneath the elastic membrane. Fatty degeneration was observed around the calcified areas. Of the three horses examined, two were aged and one was four years. In two cases the left ventricle was dilated and, beginning at the valves, the intima was corrugated and roughened by calcareous areas in the media. The coronary arteries were also affected. Verminous aneurisms were found in the mesenteric arteries in two of these cases. The dog, which was destroyed because of hypersecretion of the anal glands, showed a dilated heart with the wall markedly thin. In the aorta calcified plaques were seen in the media close to the adventitia and extending as far as the intima. The etiology of this disease in the human subject incriminates hard work, producing increased tension on the vessel-wall, intoxication by chemical substances and infections, and the author points out that similar causes may be ascribed to the quoted cases. Coronary disease, a common cause of death in human arteriosclerosis, was also noted. W. L. S.

(The Silver Fox. J. M. Beckman. *Jour. Amer. Vet. Med. Assoc.*, vol. 22, No. 1.)

The silver fox industry has attained considerable proportions in the United States and Canada during the last ten years, but, like other livestock projects, the element of disease is the chief limiting factor. The mortality in young pups is usually high. Cannibalism in the female accounts for a number, while parasites and nutritional diseases account for the rest. Round worms are the principal parasites in the pup,

and in many cases infestation appears to occur before birth. Oil of chenopodium is the most effective agent in treatment, and is administered at intervals after the animal is three weeks old. Hookworms are common in pups from the age of two months, and a suitable remedy has not been found in place of carbon tetrachloride, which is dangerous. The most frequent nutritional diseases are rickets and a peculiar eczema. These complaints are successfully treated by adding to the diet foodstuffs rich in calcium and phosphorus and by giving cod liver oil. Convulsions are common both when nursing the mother and after weaning, and are associated with an acute indigestion. Few recover, probably because the other foxes in the pen attack and devour the sick. The deep wounds inflicted on each other by their sharp canine teeth can be prevented by cutting the canines just above the level of the gum. Amputations of limbs are often necessary and these are for the most part very successful. The most common infectious disease of the fox is distemper. It is similar to that of the dog, but it has not been proven that the two are intertransmissible. Foxes of all ages are attacked and the mortality is high: it is thought that many animals die from this disease without showing symptoms. Dr. Green, University of Minnesota, who has studied the disorder, claims to have discovered the causal organism, and at the present time immunological and therapeutic experiments are being conducted with a vaccine prepared from the organism. In general, the various affections of the fox are treated on comparative lines and, in the author's opinion, the judicious application of preventive medicine is best for the welfare of the industry. W. L. S.

Army Veterinary Service.

LONDON GAZETTE. WAR OFFICE. REGULAR FORCES.

April 30th.—Major W. Ludgate, D.S.O., retires on retired pay (April 30th).

REGULAR ARMY RESERVE OF OFFICERS.

Lieut.-Col. J. J. Griffith, D.S.O., having attained the age limit of liability to recall, ceases to belong to the Reserve of Officers (April 26th).

TERRITORIAL ARMY.

Major (Prov.) C. W. Townsend, T.D., F.R.C.V.S., is confirmed in his rank (Sept. 5th, 1925).

May 4th.—Major (Prov.) C. E. W. Bryan is confirmed in his rank (February 11th).

REGULAR FORCES.

May 11th.—Capt. T. M. C. Hunt resigns his commission, and retains his rank (May 12th).

May 21st.—The following Lieutenants (on prob.) to be Lieutenants (November 4th, 1925): J. F. L. Taylor, F. W. Goodall, J. S. Kingston, P. C. W. Creagh, A. P. MacDonald.

TERRITORIAL ARMY.

Lieut. M. C. S. Sadler, M.C., late Derby Yeomanry, to be Lieutenant (May 22nd).

DIVISIONAL REPORTS.

Central Division.

A paper by Dr. W. H. Andrews, of the Institute of Animal Pathology, Camden Town, on "Animal Disease in Southern Africa," was the principal feature of a meeting of the Central Division, which was held at 10 Red Lion Square, W.C., on Thursday, April 8th, 1926. This paper, and the discussion which ensued, are reproduced at the commencement of this issue of the *Record*.

The President, Major-General Sir John Moore, occupied the Chair, and there were also present Dr. W. H. Andrews, Mr. W. Brown, Mr. R. Bryden, Major G. W. Dunkin, Mr. R. J. Foreman, Captain H. Kirk, Mr. W. Perryman, Mr. J. Stephens, Professor G. H. Wooldridge and Lieut.-Colonel T. D. Young, together with the Hon. Secretary, Mr. J. F. Macdonald.

Visitors.—Dr. R. R. Birch (Cornell University), Captain R. E. C. Bullen, Mr. G. Cairns, Major A. N. Foster, Mr. A. D. McEwen, and Mr. A. R. Smythe.

At the outset the PRESIDENT said: Before we begin the business of the evening, I wish to introduce to you Dr. Birch, of the Cornell University, who is over here and visiting the Continent also on special duty. Professor Wooldridge brought him along to be with us to-night. (Hear, hear.)

The *Minutes* of the previous meeting of the Division, which had been published in the *Record*, were taken as read and were confirmed and signed.

CORRESPONDENCE. (1) Apologies for absence were received from Major C. Davenport, Major F. T. G. Hobday, Mr. G. P. Male, Mr. J. W. McIntosh, Captain Dunlop Martin, Major P. J. Simpson, Mr. E. L. Stroud, Mr. F. W. Willett and Mr. J. Willett.

In announcing these apologies, the HON. SECRETARY expressed his regret that the alteration of the date and day from the usual first Thursday in the month had so adversely affected the attendance at the meeting.

(2) From Mrs. A. E. Willett and from Mr. F. W. Willett (brother), thanking the officers of the Division for their letters of condolence on the death of Captain A. E. Willett, which had occurred since the last meeting.

(3) From the Secretary of the "National," acknowledging the receipt of the resolution forwarded by the Division following upon its last meeting, and stating that it would be placed before the Council of the Association.

(4) From the Secretary of the "National," enclosing a form to be returned complete with certain particulars relative to the Division, including the names of its representatives to Council, to take office after the Annual General Meeting of the "National" Council.

It was agreed to allow these elections to stand over to a later meeting.

In reference to the death of Captain A. E. Willett, the PRESIDENT said: I am sure you would all have been very grieved to hear of the death of Captain

A. E. Willett. He was, as you know, one of the Past Presidents of the Society, and his death has removed a very valuable member from our midst. We have taken action by writing a letter of sympathy and attending the funeral, but I think that we should at this gathering pass a resolution approving of the action of the officers, and a vote of condolence with his wife and family.

The vote was passed in silence, with the members standing.

Morbid Specimens and Interesting Cases.

Mr. Foreman: These are a few photographs, with a short resumé of letters, from Mr. Julius Zscheyze, Secretary and Treasurer of the S.P.C.A., Pretoria, S.A. He was called to give aid to five donkeys which had been badly mauled by wild dogs. He shot three and gave first aid to the other two. Next morning, he received another call to another donkey wandering in a field. He goes on to write: "I never saw anything, in my fourteen years at the work, so terrible. I quickly took some snaps. The following are a few details: one ear missing, the other torn off and hanging by a piece of skin; both eyes gouged out; tongue torn out; upper jaw completely bitten off, under jaw crushed and mutilated; no skin or flesh on the whole forehead. The poor brute had wandered about, unable to see and hardly able to breathe, in a temperature of 105°F., and had lived from Tuesday night to Friday mid-day." He says that if ever he felt that death through his hands came as a relief it was certainly in this case. He was so affected by the horrible sight that he was unable to eat, work or sleep, and the first night had to rise at one a.m.

The large photos are interesting. The donkeys were working in brick waggons, and he destroyed eight altogether.

The horse belonged to a very old Indian. It was in good condition (apart from a large saddle sore) and about thirty years of age. An interesting feature is that the old man owned up that it could not eat grass or mealies, and so he fed it three times daily by hand on a porridge of bran. He thought it too old for his work and would like to buy another, but could not find a purchaser who would take the same care of it. Mr. Zscheyze bought it and destroyed it. The photo of the destruction is remarkable for a snapshot. He writes: "I think it shows the sure action of the humane killer perfectly. You see me standing without any sign of movement, whilst the horse seems to have dropped away from my hand the instant the bullet entered the brain."

In this summary, I cannot do justice to Mr. Zscheyze's letters, which are very interesting and show him to be a very real worker, in spite of heavy handicaps. I have to thank the recipient of his letters for allowing me to make these extracts and show the photos.

Professor Wooldridge: I wonder if many members present recall my exhibit at Red Lion Square some time ago—an Irish Terrier, whose urethra I had operated on owing to an injury to the penis. It is two years since I operated. The dog had been attacked by another and in the course of the quarrel his os penis was bitten through and penetrated into the urethra, causing a complete stricture. The dog, which was formerly in good condition, dwindled away to a bag of bones. I operated at the ischial arch and made a permanent orifice there. One might have thought that such a case might result in dribbling of urine, until one remembered that expulsion of urine is governed by the action of the sphincter muscle and of Wilson's muscle. This dog, then, never suffered from excoriation, and he made a perfect recovery. He was, curiously enough, brought to me to-day, and he is in the best of condition. He squirts his urine out at the back and it quite clears the skin.

Captain Kirk: May I ask Professor Wooldridge how he made the orifice a permanent one?

Professor Wooldridge: There was no necessity to take any elaborate steps, because there was no free channel for the escape of urine. I did, however, stitch the urethra to the skin, but, as I say, that was really unnecessary, and in any case the stitches did not remain in position long. To-day, the opening is from half to three quarters of an inch long. There is quite a dense epithelial surface between the urethra and the skin: it looks, in fact, like a natural orifice.

You may recollect also that I operated on a gelding similarly for an injury with complete obstruction of the urethra, and I think it is of great practical importance because most of us have, at one time or another, had cases where there has been epithelioma of the free extremity of a penis which has been amputated, and which has been followed by complete stricture of the end of the urethra which, owing to the shortness of the free portion, has been extremely difficult to relieve. In these cases, recourse is usually had to the slaughter of the animal, but there is no necessity for that. I operated on this case three years ago, in the same position as the operation I performed in the previous case, and the animal is still quite serviceable. Neither in this case is there any excoriation.

It might be interesting if I referred to another case which I discharged from the hospital only this week. I intend to relate it in greater detail with, if I can summon sufficient ability as a draughtsman to produce it, a diagram. It is a case of a mongrel Irish Terrier Collie. It came in with the history that it had been affected with persistent vomition for six weeks. It had eaten nothing and consequently was in a deplorably emaciated condition. I suspected a malignant growth or a mechanical obstruction. Palpating the abdominal cavity, I felt a large structure, in the anterior third of the cavity, with a consistence, but only in parts, of a sausage, while in others it was firm. I thought it might be an intussusception, but I was doubtful. I told the owner that if nothing was done the animal was sure to succumb, and I prevailed upon him to allow the performance of a laparotomy. I anæsthetised the dog with morphia and later with a mixture of chloroform and ether, equal parts. I opened the abdomen and drew out the swelling; my first suspicion was confirmed at once—

that it was intestine. The ileum was intussuscepted near the ileo-cæcal valve, into the colon. I reduced that and then discovered another swelling, which proved to be a forward intussusception of a portion of the colon. I had, therefore, a double intussusception —a common one with the most unusual complication of a posterior portion intussuscepted forwards towards the cæcum. That also was reduced comparatively easily, but then I found that the central portion was still enormously enlarged—it was about the size of a pullet's egg. I wondered whether I had got some foreign obstruction or, possibly, a tumour. I incised the bowel and did expose a tumour, the size of a pullet's egg, attached to the mucous membrane on the side opposite to that upon which I made my incision.

As to after treatment, I kept him on liquid food only —chiefly egg and milk and " Oxo " rubbed down with milk, and he made a perfect recovery. He was a bad-tempered brute and, as a result, the operation wound was only once examined in the first few days. Nothing was done beyond feeding him and giving him with his milk a little chlorodyne and petroleum emulsion—the chlorodyne to control pain and the petroleum emulsion to check constipation. The dog went out on Monday last, as well as ever it had been, putting on weight very rapidly.

The PRESIDENT thanked those who had contributed to this section of the proceedings, and expressed his pleasure that they were to have a complete record in regard to the case related by Professor Wooldridge. The *Veterinary Record* was, as they knew, very anxious for clinical articles, and there they had clinical articles of the very highest order and operations which redounded to the fame of the profession.

Captain KIRK : I would like to express appreciation at having heard Professor Wooldridge's interesting cases, not only concerning the operation for stricture of the urethra, but more particularly as regards the intussusception, which confirms what I said about two months ago, that these intussusceptions in dogs can be reduced by traction. I made that statement in the course of a paper I delivered to the Lancashire Division at Manchester, and I was immediately attacked. If the intussusception is in its early stages you can quite easily reduce it by gentle traction ; if the intussusception has been in existence for some time, the portions of the bowel wall concerned become indurated, and then the only way to reduce it is by extrusion.

Some six weeks ago an Alsatian puppy was brought to me *in extremis*—it lived only two hours after it reached my surgery—with an intussusception. So firm were the adhesions that I could not reduce the lesion even at *post-mortem* : as the serous coat turned round it split. I presume that Professor Wooldridge used silk sutures.

Professor WOOLDRIDGE : I used No. 1 silk thread.

Captain KIRK : I use silk every time—I cannot manipulate catgut.

Mr. BRYDEN : While I was at Harrison Barber's the other day, the knackerman called my intention to the stomach of a horse. It was distended with dry food (hay) and weighed a hundredweight and a quarter.

Professor WOOLDRIDGE : I was recently asked by them whether I would care to see an unusual spleen from a horse. I went up and found a horse's spleen with an enormous tumour. I put it on the scales straight away and it weighed exactly one hundred pounds. I could get no history of the case—the animal was simply found dead one morning and Harrison Barber fetched it away.

The PRESIDENT : Before we proceed to the next business on the agenda I wish to say that we have with us this evening another visitor from foreign parts, Major Foster. I am sure we are delighted to see him with us again. (Hear, hear.) Major Foster served with me in France during the War and is an old officer of mine.

Major FOSTER, in acknowledgement, said that he was on a visit from Uganda, for which country he was sailing on the 16th of the month. In Uganda they had no horses, and they of the Veterinary Department concentrated mainly upon the diseases which affected the horned stock. The particular bugbears there were rinderpest and pleuro-pneumonia. Dr. Andrews was going to read a paper on that subject that evening, and that was the reason for his presence.

Nomination.—Professor WOOLDRIDGE nominated Professor A. R. Smythe, of the Royal Veterinary College, as a Fellow of the Society, Colonel YOUNG seconding.

The PRESIDENT then called on Dr. W. H. Andrews, of the Institute of Animal Pathology, Camden Town, to deliver his address on " Animal Disease in Southern Africa."

The paper, which was a masterly exposition of the subject, was followed by a prolonged discussion. (Both paper and discussion appear at the commencement of this issue of the *Record*—Ed.)

At the close of Dr. Andrews' reply, the PRESIDENT said : I am sure we are all very much obliged to Dr. Andrews for giving us the benefit of his South African experiences, and it only remains for me to thank him most heartily for his paper and to say that the business of the evening is now at an end.

Colonel YOUNG : I am sincerely sorry, as all present must be, that Dr. Andrews had had such a meagre attendance to-night to hear his splendid paper. (Hear, hear.) Doubtless the holding of this meeting so near after Easter has had much to do with this most regrettable circumstance, and we can assure those who have missed this evening's proceedings that it is fortunate for them that they will be afforded the opportunity of perusing them in print.

The meeting concluded with the passing of a vote of thanks to the President for his conduct in the Chair.

J. F. MACDONALD,
Hon. Secretary.

PERSONAL.

Captain R. Gorman, M.R.C.V.S., has arrived on leave from Northern Rhodesia, and his address is Drumkeeran House, Kesh, Co. Fermanagh.

Southern Counties Division.*

Forty-Second Annual Meeting.

The forty-second Annual Meeting of this Division was held on Thursday, March 25th, at the Royal College of Veterinary Surgeons, Red Lion Square, London, and, following on the routine business, the members had the pleasure of listening to an interesting address by Dr. J. Stanley White on "The Application of Gland Therapy to Veterinary Practice."

The retiring President (Mr. E. S. Martin of Christchurch) occupied the Chair, and the others present included Messrs. Fred Bullock (London), John Facer (Southampton), G. N. Gould (Southampton), J. W. McIntosh (London), Major P. J. Simpson (Maidenhead), J. B. Tutt (Winchester), and J. S. Wood (Parkstone), together with Mr. G. H. Livesey, Mr. John K. Shaw, Mr. T. N. Gold, and Mr. A. T. Tyler, *visitors*.

On the proposition of Major Simpson, seconded by Major Wood, the minutes of the last meeting, as published in the *Veterinary Record*, were taken as read and confirmed.

Correspondence.

The Hon. Secretary (Mr. John Facer) announced letters or telegrams of regret at inability to be present from Mr. E. Whitley Baker (Wimborne), Major Porteous (Southsea), Captain Rockett (Salisbury), Captain Fox (Southampton), Mr. Bullen (Godalming), Mr. H. Edie (Southampton), Mr. Fowler (Godalming), Mr. G. P. Male (Reading), Mr. C. Pack (Lymington), Mr. Ripley (Hythe), and Mr. Moffat (Newport, I. of W.).

Mr. Facer also read a circular letter from the N.V.M.A. suggesting the holding of regular periodical meetings of branches with a view to securing the greatest possible efficiency of the Association. The idea, he said, seemed to be that they should give up some of their divisional meetings in favour of branch meetings, as it was thought they would thus get a better attendance, and possibly better men from the point of view of veterinary science.

The President asked if any of the other divisions had come to any decision.

Mr. Gould said he thought he had seen a report in the *Record* of one meeting where it had been discussed. Personally, he thought the idea was rather a good one.

Major Simpson said that Mr. Male was Secretary of the Southern Branch, of which they formed a part, and at the discussion at the Central Division the other day it was agreed that the President and Secretary of each division should be invited to a preliminary meeting to be called by Mr. Male with a view to ascertaining the feeling of the respective divisions. He did not know whether anything further had been done in that direction, but it seemed to him that was the proper course to adopt to begin with, and he suggested that they should authorise their President and Secretary to attend such a meeting when it was called, and to come back and report to a future meeting what was the general feeling of the Branch. Branch meetings had been held in the past. At first, he believed, they were a great success, but the subsequent meetings were absolute failures, and it was for them to consider whether it was really worth while. It would undoubtedly mean a long journey for many and, unless they could be assured of a good attendance, it would really be a waste of time to call such a meeting.

Mr. Facer said he had had no communication from Mr. Male up till then, but he would certainly attend such a meeting if it were called.

The President suggested to Major Simpson that he should make a proposition to that effect.

Major Simpson said he hardly knew if it required a formal resolution, so long as it was understood that if and when Mr. Male called a meeting their President and Secretary would endeavour to attend, but he thought it was for them that afternoon to give their delegates some idea of what their own attitude was towards the proposal.

Mr. Facer expressed agreement.

Mr. Livesey said he understood that the meeting would be called just before the meeting of the Council of the National.

Major Simpson remarked that, to put the matter in order, he would move that their President and Secretary be asked to attend any meeting that might be called, and that they state that the feeling of their Society was favourable to the idea, but that they should be guided very largely by the views expressed at that meeting.

The President seconded this and it was unanimously agreed to.

The Hon. Secretary also reported the receipt of a letter from the "National" stating that he had been elected a collaborator with the Editorial Committee of the *Record*. Mr. Facer added that he took this to be an invitation to every member of their Division also to assist by contributing articles or cases of interest to their professional journal, and he wished to take that opportunity to make a personal appeal for assistance in this direction.

Garnett Memorial Fund.

The next item on the agenda was the question of making a contribution towards the Frank Garnett Memorial Fund. Mr. Facer said they would remember they discussed this at their last meeting at Portsmouth, but, in the absence of the Honorary Treasurer, they were unable to come to any definite decision, and he was asked to write to the Secretary and tell him that it would be further considered at their meeting that day. Unfortunately, Mr. Whitley Baker had written him that he was sorry he could not be with them, and that he had been unable to get out a proper balance sheet, but he mentioned, for the information of the members, that the funds in hand amounted to roughly £15 and that there were plenty of good subscriptions to come in.

The President said he thought they should settle on what they were going to give that day.

* Received on May 3rd, 1926.

Mr. BULLOCK also hoped they would come to a decision. They none of them really knew what Frank Garnett did for the veterinary profession. He was never one to "blow his own trumpet," but he was always working for the benefit of his profession and often to the detriment of his own health and practice; there could be no two views as to his claim to some permanent memorial. His greatest work for the profession, perhaps, was done from 1906 onwards when, having realised the dreadful state of the finances of the College, he set about devising a scheme whereby the situation could be saved. During the ten or twelve years which were occupied in getting the Bill through Parliament he never spared himself for one moment. He was also President of the College from 1914 till 1918, and there was no doubt that the work Frank Garnett did, not only for the College but for the country generally, during those trying times, undermined his health and indirectly hastened his end. He (Mr. Bullock) considered it would be a crying and a lasting shame if his name were allowed to be forgotten. He believed that at their last meeting comment was made on the fact that no definite scheme had been decided upon, but with regard to that it was impossible for the Committee to formulate any scheme until they knew approximately what funds they were likely to have at their disposal, and surely they could leave it to a representative body of men such as they had on the Committee to do their best with whatever money was provided.

The PRESIDENT asked if any member would make a proposition of what they should undertake to give.

Mr. G. N. GOULD suggested that they should vote £3. 3s.

The HON. SECRETARY thought, in view of the assurance he had received from the Treasurer, that they could safely run to a little more than that. Any demands they were likely to make on the funds that day would be met.

Major SIMPSON said in that case he would be pleased to propose they give £5 5s. As Mr. Bullock had said, it was impossible fully to appreciate the great work the late Mr. Garnett did for their profession, and he hoped the memorial would be worthy of the profession.

Mr. GOULD remarked that he would willingly second Major Simpson's proposal in place of his own, and the resolution was then carried.

HON. SECRETARY'S REPORT.

In submitting his report, as Hon. Secretary, Mr. FACER said it would be extremely brief. The total number of Fellows on the books that day was 56, including three honorary Fellows. They had unfortunately to deplore the death of one old member, in Mr. F. G. Samson, while Mr. F. W. Willett and Captain H. Leeney had resigned; but, on the other hand, they were pleased to welcome three fresh members in Captain J. Fox, Mr. R. E. C. Bullen and Mr. A. Fowler. The last Annual Meeting was addressed by Major General Sir John Moore, and since then they had held three ordinary meetings, one at Christchurch (by the courtesy of the President, when they had the pleasure of listening to an interesting address by Professor Buxton); another of a social character at Southampton—which he was sorry to say was a failure; and the third last December at Portsmouth, when Major Porteous opened an interesting discussion.

On the proposition of Major WOOD, seconded by Mr. G. N. GOULD, the Hon. Secretary's report was formally received and adopted.

ELECTION OF OFFICERS.

Mr. FACER had much pleasure in nominating Major Wood as *President* for the coming year, and said he hoped he would see his way to accept, in spite of what he had written to him.

The retiring President, Mr. E. S. MARTIN, warmly supported this nomination, and it was at once unanimously agreed.

Major WOOD was then invited to take the Chair and, in acknowledging the compliment, he said he could only thank them very much for the honour they had conferred upon him. It was certainly not of his seeking; in fact, he would have liked to have seen Mr. Martin carry on for another year, as he was only just getting into his stride, but if it was their wish that he should fill the office, he could only promise them to do his best.

Mr. G. N. GOULD proposed the name of Mr. Tutt, of Winchester, as the new *Vice-President*, and this was seconded by Mr. MARTIN and unanimously agreed, it being stated that the retiring President would automatically become the other Vice-President.

Mr. FACER next proposed the re-election of Mr. Whitley Baker as *Honorary Treasurer*. He was sure no none was more sorry than Mr. Whitley Baker was himself that he was unable to be present that day and submit them a proper statement of accounts, and it might be well to recall that if it had not been for him their Society would no longer be in existence. Three years ago it was just a question whether or not they should give up the whole thing, but Mr. Whitley Baker got up and said "No." As they all knew he was a very old member of the Society and, rather than see the Society drop out, he volunteered to carry on as President in addition to filling the Treasurership.

Mr. TUTT seconded the motion, which was carried.

Mr. MARTIN next proposed the re-election of Mr. Facer as *Honorary Secretary*, remarking, amid applause, that he had carried out the duties so well that they could not possibly do better than have him again for another year.

Mr. C. Pack, of Lymington, and Mr. Facer were also requested to act as *Auditors*, the PRESIDENT pointing out that this would be a very convenient arrangement, since both Mr. Pack and Mr. Facer were within comparatively easy distance of Wimborne.

On the proposition of Mr. FACER, Captain Rockett of Salisbury and Mr. G. N. Gould were elected *representatives on the Council of the National* and, on the motion of Major SIMPSON, Messrs. G. W. Bloxsome, W. F. Maynard, J. W. McIntosh, C. H. Sheather, J. Willett, and A. C. Wild, were reconstituted as the Executive Committee or *Council*.

It was decided that the next meeting of the Society should be held at Bournemouth during the Royal Agricultural Show week.

Dr. J. Stanley White then proceeded with his lecture on "The Application of Gland Therapy to Veterinary Practice," which is receiving separate publication in the *Record*.

A short but interesting discussion followed while tea was being enjoyed, and the hearty thanks of the meeting were conveyed to Dr. White by the new President, Major Wood.

At the conclusion of the meeting, Mr. G. N. Gould ably proposed a vote of thanks to Major Martin for the manner in which he had occupied the Presidential Chair during the past year, and this vote was carried with acclamation.

John Facer,
Hon. Secretary.

NOTES AND NEWS.

The Editor will be glad to receive items of professional interest for inclusion in these columns.

Diary of Events.

June 3rd.—R.C.V.S. Annual General Meeting.
„ 3rd.—Meeting of the Central Division at 10 Red Lion Square
„ 12th.—Meeting of the Scottish Branch, at the Station Hotel, Perth; luncheon at 12-15 p.m.
„ 21st—26th.—D.V.S.M. Examination.
„ 30th.—R.C.V.S. Annual Dinner, Hotel Victoria, London, 7-30.
July 1st.—R.C.V.S. Committee Meetings.
„ 2nd.—R.C.V.S. Committee and Council Meetings.
„ 9th.—R.C.V.S. Written Examinations.
„ 13th.—R.C.V.S. Oral Examinations commence in London.

July 27th-30th.—N.V.M.A. Congress at Dublin.

Use of Sheep Dips.

Regulations affecting Arsenic.

"Some weeks ago we announced," says the *Yorkshire Herald* of May 4th, "that the Ministry of Agriculture had issued to manufacturers of sheep dips new regulations as to the use of arsenic. It is now officially stated that all sheep dips used for the purposes of the Orders of the Ministry or Regulations of Local Authorities for the dipping of sheep for the prevention and cure of sheep scab are required to be formally approved by the Ministry and to be labelled to that effect. Amongst these is a number of dips which contain arsenic as one of their ingredients. The Ministry has ascertained that in common practice there is a risk of danger to the sheep in the use of arsenical sheep dips in cases in which sheep are required by the above-mentioned Orders and Regulations to undergo double dipping, that is to say, two dippings with an interval of not less than seven and not more than fourteen days between the dippings.

"Having regard to the life history of the sheep scab parasite, two dippings of this character are considered essential for the cure and prevention of scab. In order therefore that no obstacle should be placed in the way of the success of any policy for the eradication of scab which involves the compulsory double dipping of sheep, the Ministry, on April 20th, made an Order entitled the Sheep Dips (Regulation) Order of 1926, which will come into operation on May 15th providing that 'where by any Order of the Minister or by any regulations of a Local Authority made thereunder the dipping of sheep twice in an approved sheep dip is required with an interval of not less than seven, and not more than fourteen days between the two dippings, the use for the second dipping of any dip containing arsenic is hereby prohibited.'

"The Order further requires that on the label affixed to receptacles containing any approved arsenical sheep dip, a statement shall be included to the effect that the dip contains arsenic and that its use for a second dipping under the above mentioned circumstances is prohibited.

"The new Order will not interfere with the use of arsenical dips by farmers for the purpose of preventing their sheep becoming fly-blown, or for the purpose of killing keds, ticks, lice, etc. The Order only purports to regulate the use of arsenical dips for the purposes of the statutory dippings required under the Sheep Dipping Orders and Regulations.

"In purchasing any approved sheep dip, sheep-farmers should be careful to ascertain whether it contains arsenic, and if so to refrain from using such a dip for the second dipping in the above circumstances."

Animal Diseases Research Association.

At a meeting of the directors of this Association held at Edinburgh on May 18th, the filling of the post of Director of Research, rendered vacant by Professor Gaiger's resignation upon his appointment to a University Chair, was considered. The meeting appointed Mr. W. A. Pool, M.R.C.V.S., who has been the Association's senior research assistant for about 18 months. It was intimated that occupation of the new Institute Buildings at Moredun, Gilmerton, Edinburgh, and the supplementary laboratories in the Royal (Dick) Veterinary College would be taken on 1st June, the removal to commence in May.

Frank Garnett Memorial Fund.

Thirtieth List of Subscriptions.

	£	s.	d.
Amount brought forward from twenty-ninth list	491	15	6
G. Elmes	2	2	0
	£493	17	6

The interment of the remains of the late Mr. Stewart Leighton, who had acted in the capacity of janitor to the Royal (Dick) Veterinary College, Edinburgh, since the year 1910, took place on the afternoon of May 20th, at Rosebank Cemetery.

The remains were borne to the graveside by six students of the College. Professor J. Russell Greig represented the professional staff.

The late Mr. Leighton, who had never fully recovered from a serious operation which he had undergone several months ago, has left behind him an extensive circle of friends among the past and present students of the College.

The Editor acknowledges the receipt of the following;
Communications from Mr. M. Ahmad, Mr. H. Gray, Dr. T. Hare, Mr. H. Llewelyn-Jones and Professor U. W. F. Walker.

National Veterinary Medical Association of Great Britain and Ireland.

EDITORIAL OFFICE: 10 Gray's Inn Square, London W.C.1.

All communications relative to the literary side of the Veterinary Record must be addressed to the Assistant Editor, "Veterinary Record," 10 Gray's Inn Square, W.C.1